NATIONAL MUSEUM OF VICTORIA

THE JOURNAL of The Department OF AGRICULTURE

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Issued under the direction of the Hon. E. J. Hogan, M.L.A., Minister of Agriculture.

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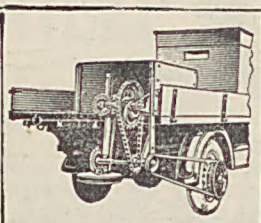

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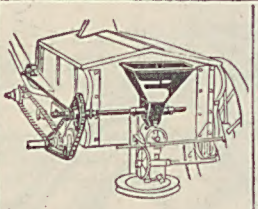

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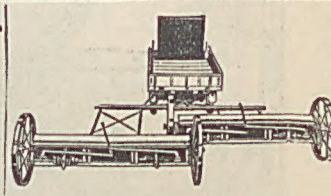

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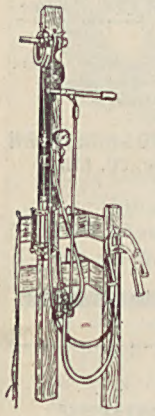

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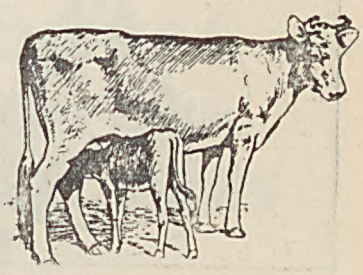

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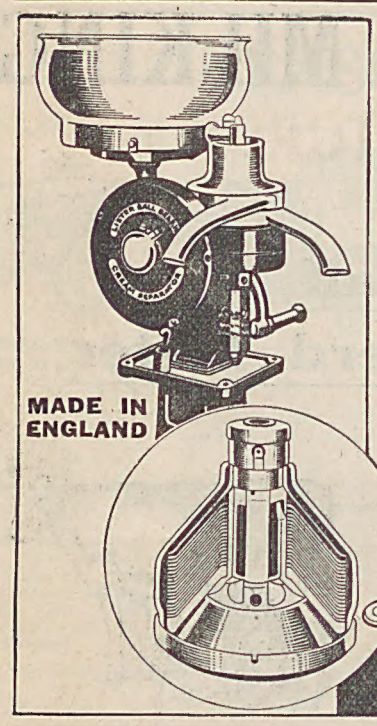

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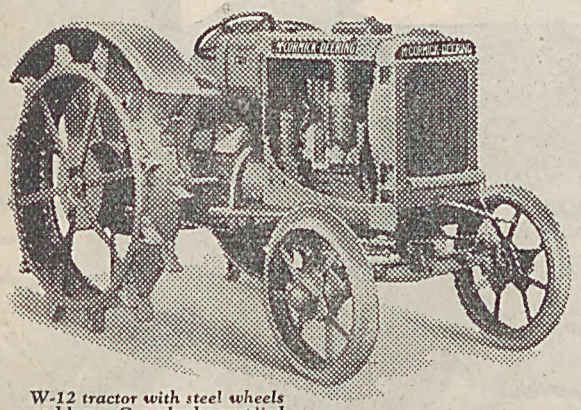

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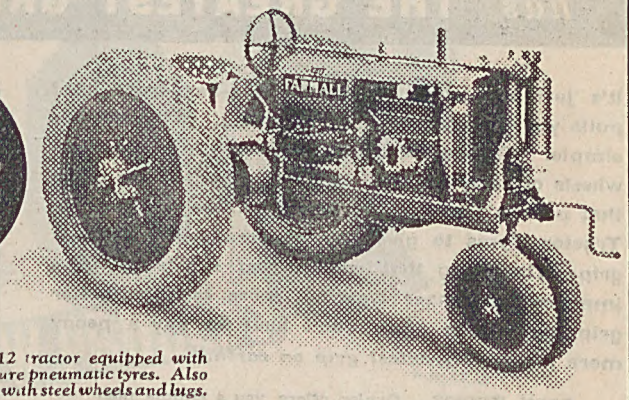

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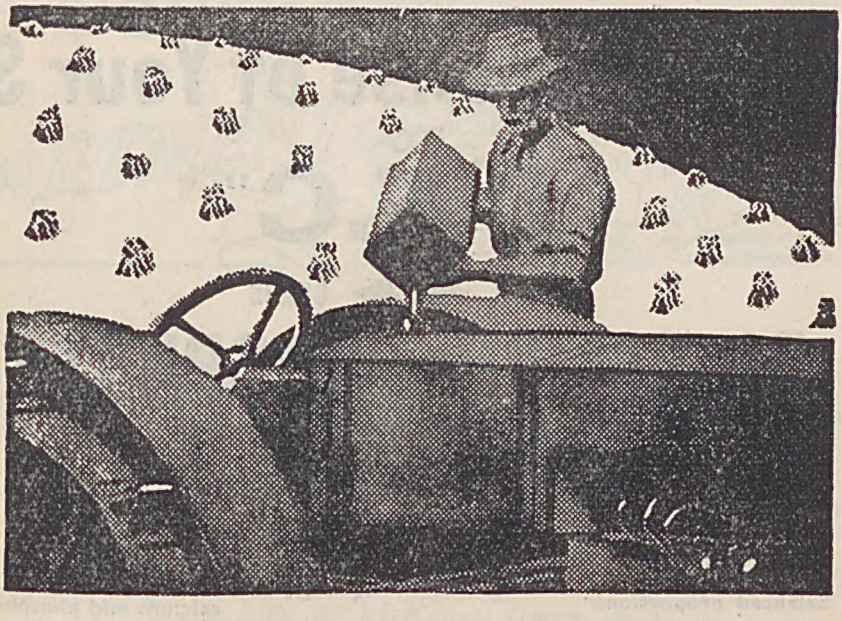

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The Journal of the DEPARTMENT of AGRICULTURE of VICTORIA

Phillip Island Farm Improvement Competition, 1935-36

Report of the Judges, J. E. Harrison, B.Agr.Sc. (pastures and fodder crops), and D. R. McKenzie (stock, etc.).

PHILLIP Island has entered an era of pasture development and stock improvement which promises to effect an important change in its kind of agriculture. It is not too much to say that the new pastures which have arisen during the past few years have taken Island farmers by surprise and have opened to them fresh avenues of primary production which have been unsuspected in the past.

The Island has a very favorable climate for pasture growth and the keeping of live stock. The average rainfall is over 30 inches annually and is highly dependable; an equable climate prevails which results in higher winter and lower summer temperatures than occur on the mainland, while frosts are hardly known and are never severe. The soils, though variable, have been shown to be largely suitable for pasture. Loam soils are the most frequent type, and some stronger soils are found which can be made to carry very good grass and clover pastures that compare favorably with those on much higher priced land in the dairying districts of the mainland. Though the Island has its difficulties with water supply, drainage, timber, shelter, and transport, it is clear from the experience of the last few years that it is capable of developing into a sound dairying district.

The Farm Improvement Competition was initiated by the Phillip Island Better Farming League in 1933 with the main object of improving the pastures and live stock of the Island farms, and increasing their production. It has an unusual design inasmuch as points are allotted for improvements made on competing farms over a period of twelve months, and the prize, therefore, is most likely to be won, not by a farmer who already has a highly improved farm, but by one whose farm is in the process of improvement. Thus the competition, though a departure from the usual type, has the merit of giving encouragement in the right quarter and of stimulating effort where greatest improvement is possible.

Prizes amounting to £25 were donated by the late Mr. A. K. T. Sambell, to whose interest and help much of the success of the competitions has been due.

On several farms the progress made since 1933 is very striking, and the Better Farming League deserves great credit for its enterprise and enthusiasm. The competitors also are to be congratulated upon entering so whole-heartedly into the competition and upon the improvements which they have secured to their farms. A word of praise is due also to those who enter well-improved farms in the competition, as these farms serve to illustrate what may be achieved and are a sound practical guide to others.

The competition this year was for the greatest improvement made to a farm for the twelve months ended November, 1936. The judges inspected the competing farms in November, 1935, and again in November, 1936, and awarded

TABLE I.—DETAILS OF POINTS AWARDED, NOVEMBER, 1935.

Name.	Pastures.	Crops.	Stock.				Plantations.	Clearing.	Fencing.	Drainage.	Water Supply.	Buildings, Additions, &c.	Machinery.	Total.
			Males.	Females.	Young Stock.	Uniformity, Health, Appearance.								
Maximum points..	**50**	**15**	**15**	**15**	**10**	**20**	**20**	**20**	**20**	**10**	**15**	**10**	**5**	**225**
Dixon, E. W...	23	..	12	12	8	15	10	13	14	6	10	7	3	133
Dixon, L. R. ..	20	5	10	10	7	14	9	14	15	7	10	7	4	132
Dixon, W. B...	20	4	10	11	7	14	9	15	15	7	11	6	2	131
Gliddon, J. W.	12	3	10	12	7	14	12	13	11	8	10	8	4	124
Graydon, J. B.	26	5	11	11½	8	15	15	17	17	8	11	8	4	156½
Jeffrey, R. G...	16	4	12	11	7	15	12	15	16	8	12	8	3	139
Justice, H. ..	22	8	11	9	6	14	11	15	16	7	11	7	3	140
Justice, V. ..	25	7	10	9	6	13	18	18	18	8½	11	8	4	155½
McLardy, N. ..	8	3	9	9	6	12	7	10	12	7	10	6	3	102
Mallory, W. A.	17	7	11	11	7	14	12	17	16	7	11	8	4	142
Roberts, J. ..	30	..	12	12	8	15	16	18	18	8	13	7	4	161
Sambell, K. ..	20	5	11	10	7	14	14	14	14	7	13	8	4	141
West, A. E. ..	30	5	11	12	8	15	18	17	17	8	11	8	4	164

points for improvements which had been made in the meantime. The points awarded in 1935 and the increase in the number of points awarded at the November, 1936, inspection are set out in Tables I. and II.

Mr. J. Graydon secured first place with an increase of 25½ points for all-round improvement effected during the year. This farm of 128 acres is well grassed and sub-divided into several paddocks with fair fencing. The dairy herd consists of 31 grade Jersey cows—mostly sired by a pure-bred Jersey bull, "Archie," by "Hoike of Banyule." Mr. Graydon now has a 2-year-old registered Jersey bull, "Windcrest Comet," from a standard tested cow. The young stock being reared on the farm show distinct promise, and three pure-bred Jersey heifers have been purchased from the "Warenda" stud.

For several years the pastures on this property have been steadily improving and it was apparent that they would one day develop rapidly. A local strain of subterranean clover has spread over all fields, including those in which perennial rye grass had been sown down, as well as fields of natural pasture. Though Mr. Graydon has known the benefits of superphosphate, it is only in the last few years that he has undertaken its extensive use. In 1933 he used 2½ tons only, but has since increased the quantity each year until, this year, he applied 6 tons to his 128 acres. A spectacular result followed. Clover has grown strongly in all fields and the grasses have improved correspondingly. There is dense pasture from fence to fence, all stock have plenty and to spare, and about 40 acres of rye grass and clover have been closed for meadow hay.

An interesting feature of this farm is the fact that in 1930 it carried only eighteen cows in fair condition, while to-day 31 productive cows are being milked and many young stock are being carried.

The water supply on the farm has been more than doubled during the year. New plantations have received attention, a 2-chain row of cypress and a 4-chain plantation of mixed gums having been planted by Mr. Graydon's son Raymond. Mr. Graydon is never weary of proclaiming the fact that the success of his home and farm is due mainly to the co-operation and interest of his wife and family.

Mr. L. R. Dixon secured second place with an increase of 23½ points for general all-round improvement. Perhaps no other farm has more to show by way of pasture improvement during the past few years. A note made in 1933 on this property states that the pastures were "very poor, goose, silver and fairy grass, and sorrel prevailing, with a little cluster clover." To-day there are several fields of very good pasture of rye grass, cocksfoot, and subterranean clover, which provide ample grazing for the stock carried.

The property has been well subdivided with strong fencing, and good buildings have been erected. A bore has been put down, a windmill erected, and water laid to three paddocks. There

Making meadow hay on the property of Capt. E. W. Dixon, Phillip Island.

is still much developmental work to be done, and Mr. Dixon may confidently go ahead with his sound programme of fencing, cropping, and sowing down of unbroken land. Every job is well done on this property and ultimate success seems assured.

Equal third place goes to Mr. R. G. Jeffrey and Mr. K. Sambell, with an increase of 21½ points for all-round improvement. Both these entrants had secured very strong development of natural pasture this year by the simple expedient of liberal top dressing. Subterranean clover has been steadily spreading on these properties, and this year selected areas were top dressed with very satisfactory results. On both properties, also, several fields have been ploughed, cropped, and sown down to improved pastures which have developed very well during the year. Mr. Jeffery has established new plantations and erected new subdivisional fences also, and made several additions of useful animals to his flock and herd. Mr. Sambell has cleared new land with a rotary hoe and cropped it; has erected new fencing and improved the water supply; and has improved his herd by the addition of several high class Dairy Shorthorn cattle.

Other entrants have achieved merit in several directions. Messrs. W. B. Dixon and W. A. Mallory both have fine improvement in their pastures, and Mr. Gliddon has also made fairly satisfactory progress in this respect. Captain E. W. Dixon has added several new fields to his

TABLE II.—INCREASES IN POINTS AWARDED, NOVEMBER, 1936.

Name.	Pastures.	Crops.	Stock.				Plantations.	Clearing.	Fencing.	Drainage.	Water Supply.	Buildings, Additions, &c.	Machinery.	Total.
			Males.	Females.	Young Stock.	Uniformity, Health, Appearance.								
Maximum points..	**50**	**15**	**15**	**15**	**10**	**20**	**20**	**20**	**20**	**10**	**15**	**10**	**5**	**225**
Graydon, J. B.	12	5	1	1½	½	1	1½	½	½	..	2	..	..	25½
Dixon, L. R. ..	12	3	1	1	½	½	½	1	½	..	2	½	½	23½
Sambell, K. ..	10	4	1½	2	½	1	½	1	½	..	½	..	..	21½
Jeffrey, R. G...	10	4	..	2	½	½	1½	1	1½	..	½	..	..	21½
Dixon, W. B...	8	4	2	..	½	½	..	..	½	..	1	2	½	19
Mallory, W. A.	8	4	½	..	½	½	..	1	1	½	1	..	..	17
McLardy, N. ..	7	1	1	½	..	..	..	½	½	..	½	1	..	12
Justice, H. ..	2	2	1½	2	½	½	..	½	1	..	..	..	1	11
Gliddon, J. W.	6	2	..	..	..	..	..	1	1½	..	..	..	..	10½
Justice, V. ..	..	2	..	1½	½	½	..	..	1	..	2	..	..	7½
West, A. E. ..	3	..	..	..	..	..	..	½	1	..	..	..	..	4½
Roberts, J. ..	3	..	..	..	..	..	..	½	..	..	..	½	..	4
Dixon, E. W...	Withdrawn.													

well improved pastures. Messrs. H. and V. Justice have improved their herds by the addition of several well bred Jersey cattle, as also has Mr. W. B. Dixon. On almost all farms some useful clearing and fencing had been done. The importance of subdivision for the proper management and use of pastures is generally appreciated, and the amount of fencing undertaken is commendable. Mr. W. A. Mallory has put in some open drains on flat land with satisfactory results. Much similar work could be done with advantage on many farms on the Island.

There was noticeable improvement in the water supply on many farms. The need for greater provision had been brought home partly by an increase in the numbers of stock carried and partly by the long period of dry weather which prevailed last summer and autumn. Several entrants had sunk new dams; two others had each put down a bore, and many had cleaned out and enlarged existing dams. This is a very important aspect of improvement and one worthy of greater development still. Useful buildings had been made on several farms, especially by Mr. W. B. Dixon, who had erected new cow shed and bails. A few entrants had added to their machinery also, the most useful probably being a new mower and hay rake by Mr. H. Justice, who is mowing a fairly large area for meadow hay this year.

Competitors who scored heavily in the various sections last year are necessarily able to score only a few points this year. This applies particularly to Mr. J. Roberts and Mr. A. E. West, both of whom have 80-acre farms which are highly improved. Mr. Roberts, who is a sheep farmer and carries four sheep per acre, sold 1 ton of wool off his farm this year, besides fat lambs and sheep. Mr. H. Justice and Mr. V. Justice also have well grassed properties.

Mr. V. Justice has extensive plantations on his property. He is well aware of the value of plantations—to use his own words, "Shelter is half the feed in winter." There were two additional entrants this year, Mr. J. W. Gliddon and Mr. N. McLardy, who have taken up neglected farms. The improvements effected are promising.

PASTURES.

Sound progress has been made in the establishment and improvement of pastures. It was clear on many farms that more feed was being grown than the stock would consume, and that the number of stock carried could be added to with advantage. It would be wise to have fodder reserves on hand, however, before buying extra stock, and those who think of increasing their flocks and herds this year would do well now to conserve as great an abundance of meadow hay as possible. The island pastures are mostly of a type which produce well in autumn and spring in normal seasons, but give little grazing in summer and winter. Hay stacks will be needed in these lean periods and in abnormal seasons, and the only secure farmer will be the one who has large fodder reserves on hand. His position is safe if at the end of any winter he still has a stack of hay or ensilage on hand for the next year, and farmers are urged to work towards this objective.

Perennial rye grass, cocksfoot and subterranean clover are the main constituents of improved pastures on the Island. Recent research work suggests that better results will be obtained by sowing one grass only with the clover in different paddocks, i.e., perennial rye grass and clover in some paddocks and cocksfoot and clover in others. The two grasses are competitive and each is inclined, except under good rainfall and high soil fertility, to check the development of the other. If cocksfoot is sown with rye grass, it is less capable of growing in summer, but if sown alone with clover it has a greater opportunity to make good growth at this period.

A few paddocks on flat land have been sown during the last few years to Paspalum, which is now showing up fairly well. Though this grass has not a high reputation, it is likely to be useful on wet land where better grasses barely persist, and a field or two may be useful in giving a green bite in summer. An interesting trial on similar land is being made by a Mr. Parry (not a competitor) with strawberry clover. A little seed was sown this season on a moist flat and numbers of seedlings have become established. It is early yet to say what the outcome will be, but the trial is worth watching, and if it is successful, farmers with similar country to improve will have another string to their bow. If summer growing pastures can be established, they will afford considerable relief in what is now a difficult period.

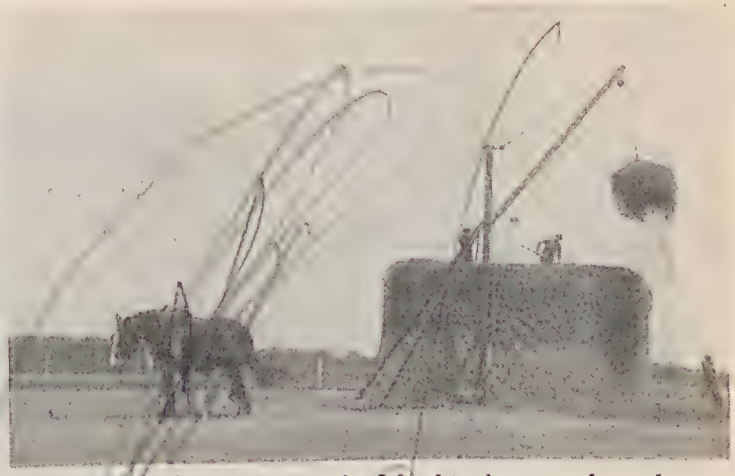
Saving Time.

A number of farmers had top dressed natural pasture this year with excellent results. There is much country which could be similarly treated and farmers are urged to take advantage of the situation. The presence of clovers, and more especially subterranean clover, is indispensable to

success. It is a simple task in the spring of the year to inspect all fields of natural pasture and decide if clovers are present in sufficient numbers to warrant top dressing in the following autumn. There is a good deal of lost opportunity in this respect, and where the method could be adopted there would often be much saving of time in growing good pastures on a farm.

Once a few good clover fields have been established, a continual spread of clover seed is taking place. It is spread in the manure of animals, especially cows and horses; on the wool of sheep; in meadow hay when it is fed out on new land; and in farmyard manure when it is carted out. It may also be deliberately introduced by sowing down seed or burr of subterranean clover. There is a very good illustration of this on the farm of Mr. H. Justice, who obtained clover burr from a field on Mr. J. Graydon's property, and spread it about on some sword grass country. This was in 1932, when the land was also top dressed. The clover was very slow for a few years, but appeared here and there. Mr. Justice top dressed last year and again this year, and now has a very dense and luxuriant stand of clover, especially where the tussocks were burnt before the burr was scattered about.

It is not a general recommendation that all pastures should be established this way. They are usually unsuitable for mowing for meadow hay, and may indeed need to be ploughed up for this reason at some future date. But when pastures are being newly established on a farm and are wanted quickly, it is a good plan to watch for opportunities of developing a natural pasture, while at the same time other fields are being sown down in a more orthodox manner.



Stacking meadow hay on the Island, using a grab-stacker.

Establishing Subterranean Clover.

Farmers generally experience difficulty in securing a rapid establishment of subterranean clover. Though its ultimate establishment seems always assured when seed is sown down, it is usually not until the third year that a strong stand appears. We must confess a certain lack of knowledge on the point (it still remains a problem how to secure a good crop of subterranean clover in the first year), but there are several well-known features connected with its establishment which deserve recapitulation.

It is known, for example, that a better result is obtained when the seed and superphosphate fall together in the soil, as when sown through a drill, than when both are broadcast and do not fall closely together. It is known, also, that a heavy seeding of perennial rye grass may check the development of the clover by its severe competition, and for this reason moderate seedings of the grass in combination with the clover are now recommended. It is not so clearly the case, but oats appear to have the same effect, especially on certain soils, and a dense crop checks the development of the clover. As both the seed and the seedling need moist conditions, it is necessary to work the soil down sufficiently fine and firm so that the surface soil does not dry out rapidly. Pests like slugs and peamite are harmful sometimes. There is little that can be done to avoid them, but the experience of farmers suggests that where these pests are bad it is better to sow either in early autumn or late winter. In one case the seedlings become well established (if favorable rains fall) before the winter sets in and so are able to withstand the attacks of insect pests, and in the other case the seedlings continue to grow and so overcome insect attack.

It is important also that a young stand should receive protection from grazing from early September onwards. The plants begin to run and flower at this period, and grazing, especially by sheep, severely checks their development. The plants should be allowed to set seed and die before even light grazing is given and, to encourage a strong growth of seedlings, superphosphate should be applied as soon as (or before) germination occurs in the following autumn.

Maize—a satisfactory fodder crop on the Island.

FODDER CROPS.

Fodder crops are grown for use in summer and winter. Oats are the usual crop for winter feed, and though there will be less necessity to grow large areas on farms where improved pastures are well established, the crop will still be useful on many farms. Besides being useful for winter grazing and for hay, it makes a satisfactory nurse crop for the establishment of grasses and clovers on new land. Both millet and maize are grown for summer feed, and though their success depends on summer rains, they are usually satisfactory crops and are also useful in preparing land for pasture establishment.

It has been the experience on the mainland that as the farm pastures become highly improved, there is less need for special fodder crops. This is so more especially on well balanced farms with a variety of pastures which afford considerable continuity of grazing; but in all cases the growing of fodder crops may only be relaxed when at least enough meadow hay or ensilage is on hand for the winter needs of stock.

STOCK.

Farmers on the island are engaged in both dairying and sheep raising. Intensive methods are not generally followed, but on several farms there is abundant evidence of improved practices. The general standard of the stock has shown improvement during the past four years, but there is still room for improvement, particularly in the quality of dairy herds. The system recommended is that of breeding up, depending mainly on the sire. Having decided on a breed, the important thing is to secure a registered bull from a standard tested cow with a good record of butter-fat production, though the quickest way would be to purchase heifers from selected females proved by having been tested in the various Herd Testing Associations throughout the State. Six of the competitors now have their cows under Association Test.

Very few pigs are kept, and now that this industry has entered on a more prosperous period, this section should receive more attention. The sheep show improvement each year, while the horses seen were well up to the standard of the mainland.

Although some attention has been given to tree-planting, more plantations are still required to shelter the stock from the cold bleak winds to which the Island is subject. The native ti-tree makes excellent shelter whether in clumps or as a hedge. It is easily grown, and probably is the cheapest way of making shelter available.

A Clean Milk Competition

Bacchus Marsh and Melton Shires

Report of the Judges, L. P. Ingham, Senior Dairy Supervisor, and K. T. Harrison, Dairy Supervisor.

The cowshed, dairy, and wash room owned by Mr. W. Cahill (Melton South), the outright winner of the competition.

IN the hope and expectation of demonstrating to dairy farmers the advantages accruing from correct dairy practice and attention to sanitation, a Clean Milk Competition was promoted early last year in Bacchus Marsh and Melton shires. A competition of any kind, to be of use, must have practical value. A clean milk competition must be regarded as rich in this respect. One aspect of importance is that it must materially affect for its good a considerable proportion of the milk going into metropolitan supply. A further point of interest to the producer, is that the awards obtained under a competition are valuable to a farmer seeking a milk contract. Before the announcement of the results of this first competition, several competitors had their contracts increased, and further benefits in this respect to those who made a good showing may be expected.

While Bacchus Marsh is recognized as one of the leading dairying centres of the State, the response from that shire was disappointing. Melton shire, with half the dairying population, provided 50 per cent. more entrants. This might be accounted for by the fact that the majority of Bacchus Marsh dairy farmers supply their own co-operative depot, while the Melton producers are by force of circumstances compelled to operate in a keenly competitive market, and are consequently more alive to the value of demonstrating the high quality of their product.

It was believed that the observance of the essentials in the production of clean milk was within the power of every dairy farmer, however limited his means; and with this in mind the scale for the allocation of points was drawn up. The outcome of the competition has proved this belief to be right, for where due regard was given to sanitation in lay-out and drainage, the most effective results were obtained from clean milking methods and thorough sterilization of utensils. If a man failed in these particulars, elaborate buildings counted for nothing. The English scheme for the conduct of clean milk competitions was taken as a model, but to simplify the judging, this was modified

and scoring points were divided into six sections:—1. Health of cows; 2. Absence of mastitis; 3. Equipment; 4. Dairy practice; 5. Wad test; 6. Bacterial count.

While it was recognized that tuberculin testing should play a large part in the grading of milk, and must be allotted a definite place in future competitions, it was felt that it had not yet become sufficiently a part of the routine of herd management to justify its inclusion. However, a number of the Melton competitors submitted their herds to the test, and it was necessary to recognize their progressiveness in this respect. Where no other disease was discoverable by manual examination of the cows these herds gained the maximum points for health. Herds not tuberculin tested were restricted to 90 per cent. of the maximum.

The first round of inspections was made in the second quarter of the year. These visits were purely advisory, and the majority of competitors proved eager to adopt any suggestions made. In the three judging inspections which were made during the months of July, August, and September, it was gratifying to observe the great improvement made from month to month. On many of the farms the "cowy" atmosphere within the milking shed had been eliminated entirely; while correct dairy practice had obviously become a part of the routine. The farmers showed an intelligent appreciation of the benefits derived from proper observance of dairy hygiene, and from the general attitude at the conclusion of the competition it may be inferred that the improvement in methods will be sustained.

One of the most valuable factors in the improvement of milking methods was the wad test. This was carried out at milking time by means of a sediment "gun." Samples were taken from individual unstrained milkings, the resulting wads being used as a basis to determine the score for the wad test. This phase of the competition proved an object lesson to the milkers and created a healthy spirit of rivalry in the sheds where several milkers were employed. Where the lesson was taken to heart a great improvement was effected, as was shown when later samples were taken. A sample was also taken from the bulk strained milk and tested to determine the efficiency of straining.

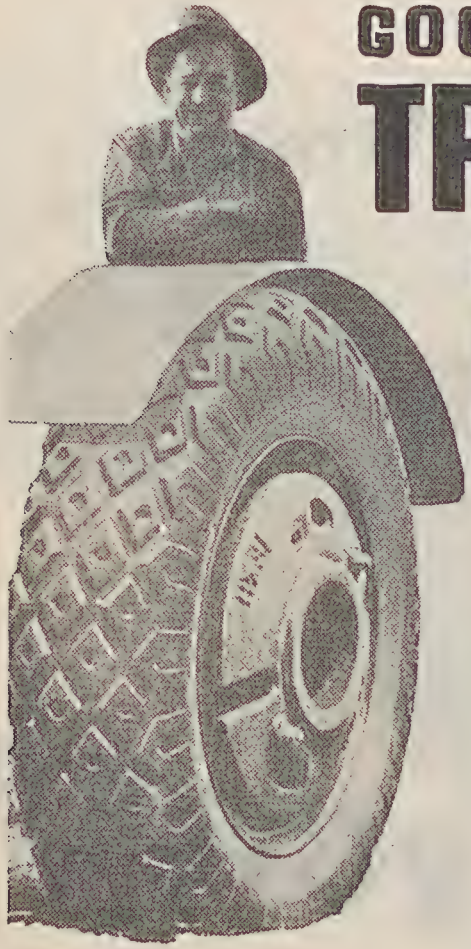
From this section of the competition a very noteworthy fact emerged. Where a feed room is attached to a milking shed it is useless to expect a satisfactory wad, unless there is an adequate dust-proof partition between chaff-house and bails. This condition obtained on the five farms that headed the list in this section. As the wad test was an important factor in deciding the awards, the significance of the dust-proof partition can easily be seen.

The routine bacterial counts made from samples collected by the metropolitan staff of the Dairying Division of the Department of Agriculture were utilized in allotting the points for the bacterial count section. Points here varied from the maximum 500 for a count of 20,000 or less, to nil for 1,000,000 and over.

An analysis of the scale of points shows that methods and milk quality counted for more than elaborate equipment, a condition which gave the man with premises of a medium structural

TABLE I.—CLEAN MILK COMPETITION—MELTON SHIRE.

Name.	Number of Cows.	Health of Cows.	Absence of Mastitis.	Equipment.	Dairy Practice.	Wad Test.	Bacterial Count.	Total.
		Max., 100.	Max., 100.	Max., 100.	Max., 400.	Max., 300.	Max., 500.	Max., 1,500.
W. Cahill, Melton South ..	18	90	100	81	363	283	494	1,411
Davey Bros., Rockbank ..	38	90	100	90	355	260	500	1,395
J. Paterson, Melton South ..	46	100	100	86	361	248	498	1,393
M.4	40	90	100	79	341	269	500	1,379
M.5	19	100	100	71	348	221	500	1,340
M.6	33	100	98	75	338	228	500	1,339
M.7	20	90	100	71	293	283	500	1,337
M.8	50	100	98	63	315	235	498	1,309
M.9	40	100	100	80	324	197	496	1,297
M.10	23	100	100	64	306	192	491	1,253
M.11	20	90	100	70	318	165	500	1,243
M.12	108	100	100	72	297	146	480	1,195
M.13	23	100	98	81	305	25	405	1,014



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Dairy buildings and portion of the herd of Mr. W. S. Richardson, who gained first prize in the Bacchus Marsh section.

standard a sporting chance in competition with the man with first-class premises. More importance was attached to the wads from unstrained milk than from strained, on the ground that the quality of milk is affected more by what goes into it than by what is taken out.

As far as is known this competition was the first of its kind in Victoria, if not in Australia, and was necessarily experimental. Obvious improvements in the scheme would be to extend the contest over twelve months, with quarterly inspections, which would give a more accurate summary of a competitor's average methods over the varying seasons of the year; and to make tuberculin testing a feature. In the English competitions 50 per cent. of the marks given for the health of cows depended on whether or not all the cows in the herd had within the preceding six months passed the tuberculin test. This is as it should be.

As the demand for tuberculin tested milk is becoming more and more insistent, self-interest will compel the early general adoption of the test. Then its inclusion as an important factor in a scheme of competition will not discourage farmers from entering.

Where it is warranted by the number of entrants, competitors should be divided into two groups, the first for herds of, say, from 10 to 25, and the second for larger herds. While there are factors that have a greater influence on the production of clean milk than has the size of the herd, it is undeniable that the same attention to detail is more difficult to retain throughout the milking of a large herd. For this reason great credit is due to the second prize winner in the Bacchus Marsh section. The painstaking conscientiousness of Mr. Burns and his family, who are in charge of this shed, puts to shame the slapdash methods that obtain amongst many herds very much smaller in size.

At the inception of the competition an entry fee of 5s. was charged in order to provide a prize fund, which was further augmented by donations. The Bacchus Marsh branch of the A.N.A. gave a handsome shield for annual competition, and generous cash donations were made by the Bacchus Marsh Dairymen's Co-operative Association, Messrs. White and Holden, M's.L.A., and a number of district residents. Several farmers who felt that they had no chance against men with better premises, gave an entry fee "to help on the good work," promising to be in the running in future competitions. The *Bacchus Marsh Express* relieved the executive of the expense of printing the certificates which are to be awarded to all competitors gaining more than two-thirds of the total number of marks, and to their farm workers. It also gave the competition valued support and publicity.

The following is a complete summary of the scale of points used in judging:—

1. Health of Cows.—Remission of points according to the seriousness of any disease discoverable by manual examination; 10 per cent. for tuberculin tested stock—100 points.

2. Absence of Mastitis.—Remission of points according to the percentage of cows affected—100 points.

3. Equipment.—*Food and Water.*—Food—clean and wholesome (2), Water—clean and fresh (2), convenient and abundant (2); *Cowshed.*—Location—well drained and free from contaminating surroundings (6), Construction—impervious floor (5), effective drains (5), easily cleaned walls, ceilings, stalls, and mangers (3), drainage from gutters (5), Facilities for cleansing—water supply for washing down and/or supply of lime for liming (4), equipment for washing milker's hands (5); *Milk Room.*—Location—free from contaminating surroundings (5), Construction—impervious floor and drain (5), impervious walls and suitable ceiling (3), light and ventilation (3); *Utensils.*—seamless buckets and cans (10), strainer (sterilized cloth (1), metal gauze only (0), cotton wool pads (2)) (2), cooler (8); *Cleansing equipment.*—wash-room and trough (5), sterilizing equipment (15), and clean water (5). Total for equipment 100 points.

4. Dairy Practice.—*Cows.*—General cleanliness (free from obvious dirt, 15) (20) cleaning preparatory to milking (40); clipping of hair on udders (5); *Cowshed.*—Cleanliness—floors and gutters (12), walls and partitions (3), ceiling, rafters, and ledges (6), air at milking time—freedom from dust (7), freedom from flies (3), yards around cowshed—cleanliness (5), condition of drains (2); *Milkroom.*—Cleanliness of—floor (2), walls and ceiling (8), freedom from dust and flies (10), used solely for handling and storing milk (8), yards around milkroom—cleanliness (5), condition of drains (2); *Utensils.*—Care and cleanliness—buckets (20), strainer (20), cooler (25), cans (35) (marks allotted according to degree of sterilization), protected from contamination (35), cleanliness of milking stools and leg ropes (5); *Milking.*—Cleanliness of milkers (15), manner of milking (40); *Handling Milk.*—Milk removed immediately to milk room (15), protection from contamination during removal to milkroom (5), efficient straining (2), cooling—cooled to 55° F. or below, maximum for each degree above 55° F. up to 60° F. one point deducted, for each degree over 60° F. two points deducted (45), period and manner of storage (delivery twice daily, maximum) (10), and method of transportation (5). Total for dairy practice 400 points.

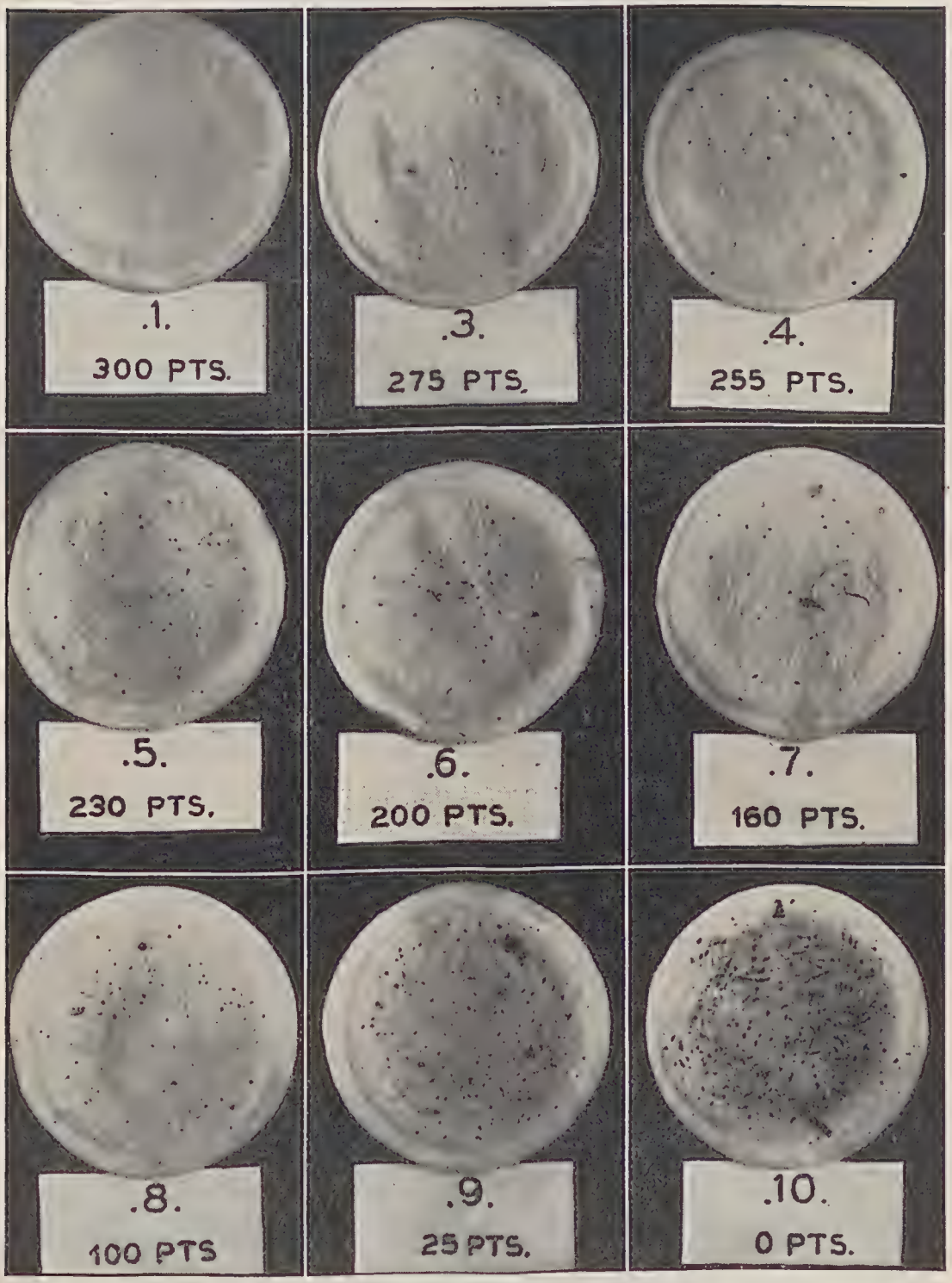
5. Wad Test.—Total 300 points spread over ten grades (see accompanying illustration). The final figure represents an average of all wad tests made.

6. Bacterial Count.—Points ranged from a maximum of 500 for counts of 20,000 or less to nil for counts of 1,000,000 or more. Two points were deducted for each increase of 20,000 in the count up to counts of 140,000, five points for each 20,000 increase from 160,000 to 500,000, and from this stage the points awarded decreased rapidly with any increase in bacterial count.

The points shown in Tables I. and II. are the average of those allotted in each section over all inspections. Most of the entrants lower down on these lists finished up much more creditably than the totals would seem to indicate.

TABLE II.—CLEAN MILK COMPETITION—BACCHUS MARSH SHIRE.

Name.	Number of cows.	Health of Cows.	Absence of Mastitis.	Equipment.	Dairy Practice.	Wad Test.	Bacterial Count.	Total.
		Max., 100.	Max., 100.	Max., 100.	Max., 400.	Max., 300.	Max., 500.	Max., 1,500.
W. S. Richardson, Bacchus Marsh	23	90	100	93	362	229	488	1,362
Miller Bros. and R. Burns, Bacchus Marsh	80	90	100	93	378	200	496	1,357
Miller Bros. and L. Stevens, Bacchus Marsh	115	90	100	84	338	173	489	1,274
B.M.4	11	90	98	79	314	225	440	1,246
B.M.5	70	90	90	76	345	185	420	1,206
B.M.6	56	85	100	71	303	138	500	1,197
B.M.7	76	90	90	77	342	103	491	1,193
B.M.8	43	90	98	65	260	160	410	1,083



The Wad Test.

The scale of points shown above was adopted as a standard when making awards in this section of the competition. (No. 2.—290 points is not shown.)

The Awards—Melton.

The outright winner of the competition was Mr. W. Cahill, of Melton South, who gained the A.N.A. Challenge Shield and a cash prize in addition to the trophy awarded to the winning competitor of the Melton shire.

Mr. Cahill's dairy premises, while not elaborate, possess many excellent features. The five-bail galvanized iron cowshed is open to the east, and has a small feed room attached to one end. It is fitted with well-made mangers. The cooling room, 6 feet from and in a line with the shed, is a weatherboard structure, well ventilated and lined throughout with sheet iron. A 3-ft. dado has been painted with a black bitumastic odorless paint, and the remainder enamelled white, the result being a very sanitary and attractive inside wall surface. The wash room is a skillion off the cooling room, fitted with a good type of dairy heater and sterilizer, a galvanized iron wash-trough and can racks constructed of piping. The approach to the dairy and wash is concreted, and proper provision has been made for drainage. The water supply for washing the milkers' hands is obtained from a 50-quart can, fitted with a tap.

One of the disabilities under which Mr. Cahill labours (and which it is his intention to rectify) is the lack of a pressure water supply. This makes his performance in the competition particularly creditable, the high standard of upkeep and the wholesome atmosphere prevailing being the same throughout the course of the competition.

There are few dairy farmers who would find it beyond their means to bring their premises up to this standard of sanitary simplicity, which combines comfort and convenience in an attractive environment.

The effort of Messrs. Davey Bros., who gained second prize in the Melton section, was a splendid one. Dairying on stoney country in a very low rainfall area—about 10 inches of rain was received in 1936 up to the end of November—nature has not been kind to them, and for a number of years they were forced to conduct their dairying operations under unenviable conditions. Early last year, however, they were able to rebuild and provide themselves with necessary dairy appliances, and the results have been very encouraging to the family. The site selected for the new buildings was necessarily an exposed one, but it enjoys complete isolation from all other farm buildings. It is intended to erect a breakwind wall around the bailing yard. A cypress hedge has been planted which later on will afford shelter and shade.

The spotless condition of these premises at all times, and the cleanliness observed in all phases of dairy work by the family, point to higher honours in future competitions.

Third prize went to Mr. J. Paterson. The modest structural standard of the premises occupied by Mr. Paterson, led him to believe at the outset of the competition that he would be amongst the "also-rans." By making the most of what he had, and exercising the generally sound and careful methods which are usual with him and his staff, he proved a very serious competitor. Steam under pressure is available here, and was a factor in the result.

In addition to the above, a trophy was donated by Mr. M. McMahon of the Sunbury Milk Depot for competition among those entrants supplying that depot. This was won by Mr. C. E. Izon of Sunbury. Mr. Izon's performance is a particularly good one when it is considered that he is a newcomer to dairying, last season being his first in that occupation.

The awards for Melton shire are set out in Table I. As intending entrants were assured before the competition began that the names of

The dairy premises of Messrs. Davey Bros., Rockbank. A feature here is that the dairy an wash room are connected by a V-type doorway.

Portion of Mr. C. E. Izon's cowshed.

prize winners only would be made public, those qualifiying for certificates are indicated by numbers.

Bacchus Marsh.

First prize in the Bacchus Marsh section was won by Mr. W. S. Richardson. In all his farming activities, Mr. Richardson displays a method and a neatness for which it would be hard to find a parallel, and his conduct of the dairy, where he is ably assisted by his wife and daughter, is in keeping. The cowshed is attached to a barn on a well-drained gravelly rise, and the upkeep of the dairy premises and surroundings is such that a visitor between milkings would find it hard to believe that active dairying is engaged in. It is a part of the routine to pick up all cow droppings within a wide radius of the shed. These are deposited at a distance and periodically applied to the land. The result of this practice, which could profitably be copied by all dairy farmers, is that the yard is entirely free of mud, even in the wettest weather. Quiet handling of the cows is a feature which does a lot to ensure cleanliness in the bails.

While it is not the intention here, to offer criticism of the equipment of any competitor, it is not out of place to mention that the lack of a completely dust-proof partition between bails and the barn, where lucerne hay—a notoriously dusty fodder — is chaffed, may be blamed for a considerable loss of points in several sections.

Mr. R. Burns gained second prize. As mentioned elsewhere, the performance of Mr. Burns and his family was an outstanding one. Milking machines, which in careless hands are so often a source of trouble, are in use here, and the excellent results obtained show that more than the average efficiency in dairy management prevails in this shed. A good water pressure is available, and this, together with the liberal use of the paint pot, keeps one of the largest sheds in the district invariably spick and span.

Third prize went to Mr. Stevens who, with his family and staff, handicapped as they were by structural alterations proceeding over the greater part of the competition, also made a creditable showing. A uniformly good quality of milk was produced, and the standard of upkeep throughout was very fair.

The awards for the Bacchus Marsh section are set out in Table II.

Field Day.

In co-operation with the sectional winners of the competition a Field Day has been arranged for Friday, 22nd January, when the trophies will be presented to the winning competitors. It is desired to make the field day primarily one for young farmers, and with this object in view a representative (under 15) of each affiliated Young Farmers' Club in the State has been invited to contest two events, viz., a lecture on "Dairy Sanitation and the Handling of Milk and Cream" and a "Clean Milking" competition. Trophies have been donated for the winners of these events.

It is proposed also to visit and inspect the farms and premises of Messrs. W. S. Richardson, Miller

and Burns, and W. Cahill, when points of interest will be explained by officers of the Department of Agriculture.

All affiliated Young Farmers' Clubs have been circularized with regard to the arrangements for the field day, but any further particulars can be obtained from the Hon. Secretary, Mr. K. T. Harrison, Bacchus Marsh. Morning trains from Ballarat and Melbourne will be met.

Proceedings will commence at 10 a.m. with the inspection of Mr. Richardson's farm and at 10.30 a.m. short addresses will be given by parliamentary representatives and departmental officers.

Butter Production and Export

The following table shows:—

(*a*) Factory production of butter and cheese in Victoria for the period July to October 1936, compared with the corresponding period of 1935; and

(*b*) Quantities and percentages of various grades of bulk butter examined in Victoria from 1st July to 28th November, 1936, in comparison with the corresponding period of 1935.

FACTORY PRODUCTION OF BUTTER AND CHEESE IN VICTORIA (QUANTITIES IN TONS).

Month.	Butter.		Cheese.	
	1936.	1935.	1936.	1935.
July	2,430*	3,039	242*	285
August	3,556*	4,365	372*	367
September	6,688†	6,159	526*	504
October	8,905†	9,309	707†	689
Totals, 4 months	21,579	22,872	1,847	1,845

* Revised. † Subject to revision.

BULK BUTTER EXAMINED FOR EXPORT IN VICTORIA (QUANTITIES IN TONS).

Period.	1936. How Graded—				Total.	Period—	1935. How Graded—				Total.
	Ch.	1st.	2nd.	Pty.			Ch.	1st.	2nd.	Pty.	
1st July to 31st October ..	7,076	2,804	592	62	10,534	1st July to 2nd November ..	8,619	4,079	759	79	13,536
1st November to 28th November	4,929	1,385	366	39	6,719	3rd November to 30th November	4,890	1,879	462	37	7,268
Totals 1st July to 28th November	12,005	4,189	958	101	17,253	Totals 1st July to 30th November	13,509	5,958	1,221	116	20,804
Percentages ..	69·6	24·3	5·5	0·6	..	Percentages ..	64·9	28·6	5·9	0·6	..

An Outline of Commercial Pig Feeding

IN the following article the subject of Commercial Pig Feeding is treated in outline, the subject matter being presented mainly in tabular form with the minimum of explanatory letterpress. This is not intended to be a complete treatise on the subject but should be a handy booklet of reference for the pig farmer who desires to feed his stock with the minimum of wastage.

We wish to express our indebtedness to Mr. H. W. Gardner, B.A., of the Hertfordshire Institute of Agriculture, Oaklands, St. Albans, England, as it was his "Simple Guide to Pig Feeding" which provided the stimulation to prepare this article, and, with the necessary alterations to suit local conditions, formed the foundation of the matter contained therein.

Two chief types of diet have been elaborated, namely, those containing milk as the principal constituent and those not including milk. The former type is suitable for use by dairy farmers, &c., the latter being useful for those who wish to dispose of surplus grains in a profitable manner. These diets are set out in Tables I. and II. on the following page.

Only farmers dealing with very large numbers of pigs are justified in making up a series of rations such as the six set out in Tables I. and II. Farmers dealing with a small or moderate number are advised to choose the two rations B and D, and to use them as follows. (There is, however, very little objection to choosing A or C instead of B as one of the two rations.)

Ration B.—For Sows-in-Pig, Suckling Sows, Young Pigs to twelve weeks, and Boars.

Ration D.—For Porkers and Baconers from twelve weeks onwards.

Boars and in-pig sows should be given a moderate allowance of B, together with grazing or green foods.

If a farmer prefers to select three rations, a good choice is A, C, D. A, for all sows and stock boars; C, for weaners, eight to fourteen weeks; D, for porkers and baconers, fourteen weeks onwards.

Ration E can be made approximately by mixing 1 cwt. of D with 1 cwt. of crushed barley.

Farmers who hesitate to change at twelve weeks straight from B to D can use a mixture of these two rations for a week or so during the change over. This is equivalent to feeding ration C.

Amounts to Use.

The experienced pig man needs little guidance on amounts; he has acquired the art of feeding and modifies the allowance according to condition,

TABLE I.

DIET WITH MILK.

(The amount of skim or butter-milk used in compounding these rations may vary considerably (according to available supplies), but approximately ¼ to ½ of the diet by weight should be made up of mixed meal (concentrate)).

Ration.	A.	B.	C.	D.	E.	F.
Class of Animal.	In-pig Sows and Stock Boars.	Suckling Sows and Weaners to 10 Weeks.	Porkers and Baconers, 10-14 Weeks.	Porkers and Baconers, 14-24 Weeks.	Baconers, 24 Weeks Onwards.	Fattening Boars and Sows, and Baconers Last Fortnight.
Food.	Parts by Weight.	Parts by Weight.	Parts by Weight.	Parts by Weight.	Parts by Weight.	Parts by Weight.
Skim Milk, or Butter Milk ..	8 — 24 *	8 — 24 *	4 — 12 *	5 — 9 *	5 — 9	5 — 9
Pollard	6 6	6 6	2 0	1½ 0	0	0
Crushed Barley	3 3	3† 2½†	2 3	3 4	5	5
Pea or Bean Meal	0 ½	0 1†	0 1	0 1	0	0
Meat Meal	½ 0 *	1† 0 *	⅓ 0 *	½ 0 *	½	0
Mineral Supplement‡ ..	Essential	Essential	Essential	Essential	Essential	Not Necessary
Grazing or Green Food‡ ..	Essential	Essential	Essential	Essential	Essential	Not Necessary

The " Parts by Weight " may be pounds, cwt., or tons according to the number of pigs fed. 1 gallon of milk = 10 lb. approximately.

* Optional concentrate diet—use either one or the other. † Add gradually to the diet for suckers and weaners. ‡ See elsewhere for additional information.

When milk is not available, that portion of the ration can be replaced by meat-meal or dried skim milk. Dried whole milk contains too much fat and is liable to produce soft pork. 10 gallons of fresh skim milk = 1 lb. of dried skim milk, or ½–¼ lb. of meat-meal.

TABLE II.

DIET WITHOUT MILK.

Ration.	A.	B.	C.	D.	E.	F.
Class of Animal.	In-pig Sows and Stock Boars.	Suckling Sows and Weaners to 10 Weeks.	Porkers and Baconers, 10-14 Weeks.	Porkers and Baconers, 14-24 Weeks.	Baconers, 24 Weeks Onwards.	Fattening Boars and Sows, and Baconers Last Fortnight.
Food.	Parts by Weight.	Parts by Weight.	Parts by Weight.	Parts by Weight.	Parts by Weight.	Parts by Weight.
Pollard	6	6	4½	3	3	3
Crushed Barley	3	3	4½	6	6	6
Meat Meal*	½	1	1	1	½	0
Mineral Supplement † ..	Essential	Essential	Essential	Essential	Essential	Not Necessary
Grazing or Green Food† ..	Essential	Essential	Essential	Essential	Essential	Not Necessary

The " Parts by Weight " may be pounds, cwt., or tons according to the number of pigs fed.

* Figures are for meat-meal (without bone). Meat-meal (with bone) is less suitable—the quantities should be increased by one-half.
† See elsewhere for additional information.

appetite, age, &c., of the pigs. The following suggestions may be a useful guide as they provide for a consumption of about 6 cwt. of concentrates from weaning to 140 lb. dead weight, equivalent to a consumption of just under 4 lb. of food per 1 lb. live weight gain :—

Age of Pigs.	Approximate Live Weight.	Dry Meal per Day.
Weeks.	lb.	lb.
8 to 12	25 to 50	1 to 2½
12 to 16	50 to 80	2½ to 4½
16 to 20	80 to 115	4½ to 5½
20 to 24	115 to 155	5½ to 7
24 to 30	155 to 220	7 to 9
Boars, according to size, &c. ..		4 to 8

Sows.—For in-pig sows 2 lb. rising up to 6 lb., according to condition of sow and amount of grazing available.

For *sows with litters* a reasonable estimate is 7 lb. plus ½ lb. rising to 1 lb. per pigling. Preferably, some of the allowance per pig should be fed separately to the young pigs when they begin to eat at four or five weeks of age.

Where grazing, green food, or swill is allowed, the above amounts should be correspondingly reduced.

How to include Other Foods in the Standard Rations.

Crushed barley is a starchy food of low protein (albuminoid) content.

Pollard has a medium amount of both starch and protein.

Meat meal is a high protein food.

Any substitutes introduced into the ration may be regarded as replacing one (or more) of these three components. The fractions after the various substances show how much of the crushed barley or pollard in the standard rations may be replaced safely by the particular food. When making such changes, care must be used not to raise the total oil content of the ration above 3 per cent.

TABLE III.—OTHER FOODS IN STANDARD RATIONS.

CRUSHED BARLEY.

May be replaced by—	Fraction which may be replaced.
Wheat (coarsely ground)	½
Oats (finely ground)	⅔
Maize meal	¼
Rice meal or rice flour	¼
Sugar beet pulp (dried)	¼
Potatoes may replace barley meal on basis— 4 potatoes = 1 barley meal	All

TABLE III.—*continued.*

POLLARD.

May be replaced lb. for lb. by—	Fraction which may be replaced.
Bran	½
Bean meal or pea meal may replace ½ or ⅓ of the pollard, but a better basis of substitution is— Pea meal / Bean meal } 1½ parts = ½ part meat meal + 1 part barley. Do not replace more than ½ part meat meal in this way.	⅓

MEAT MEAL.

May be replaced lb. for lb. by—	Fraction which may be replaced.
Blood meal may replace meat meal on the basis—2 parts blood meal = 3 parts meat meal	All
Linseed cake may replace meat meal on basis—1 part linseed cake = ½ part meat meal	½
Cooked fresh meat may replace meat meal on the basis— 1 part meat meal = 4 to 6 parts cooked meat (depending on the amount of water added in cooking)	All
Dried skim milk.	All
Separated Milk.—10 gallons of this may be considered equal to 7 lb. meat meal + 7 lb. crushed barley. (For additional information, see under "*milk.*")	

Minerals.

In recent years, an enormous amount of work has been conducted in connexion with the mineral requirements of farm live stock. Fortunately, this work has shown that under practical, common-sense conditions there is unlikely to be a shortage of the majority of the mineral elements which animals require. In the case of pigs, *lime is the most important mineral* with common salt next. A simple mixture is :—

Chalk, or Ground Limestone, or Slaked Lime .. .. .. 4 parts.
Common salt .. .. .. 1 part.

This mixture may be fed in either of two ways, i.e.—

(1) Add once a day to the mixed food in the trough at the rate of 1 oz. per pig per day for all classes of pigs except in-pig and suckling sows—the latter will require 2½ oz. each per day.

Weigh out five ounces of the mixture and obtain a tin which holds this amount exactly; this can then be used as a measure; or

(2) Add to the diet at the rate of 3 lb. per 1 cwt. of mixed meal.

This method is less satisfactory and more expensive.

When neither milk nor crushed grains are used, it is desirable to replace one part of chalk (or limestone or lime) by one part of steamed bone flour or dicalcic phosphate. Place a tin of charcoal in every pen so that the pigs have free access to it at all times. The addition of minerals and meat meal to the diet stimulates the flow of milk in suckling sows, and will cure some types of sterility, abortion, and unthriftiness of suckers.

Grazing and Green Feed.

All classes of pigs benefit from the addition of fresh green food to the ration or from the provision of adequate grazing. Some bacon curers and pork butchers prefer pigs which have been "topped off" in sties, and for this reason green food may be avoided for several weeks prior to slaughter. If grazing is provided, the paddocks should be used systematically and not permitted to become eaten out (bare) or fouled with droppings. *Spell the paddocks at regular intervals* and plant good grazing crops such as rye grass, green barley and oats, clover, lucerne, &c., and forage crops such as rape, potatoes, Jerusalem artichokes, pumpkins, swedes, &c.

One part of crushed barley ..	= 4 parts of potatoes or artichokes.
	= 8 to 10 parts rape, grass, lucerne, &c.
	= 8 to 11 parts mangolds, swedes, &c.

Provide shade and shelter in the form of sheds or plantations of trees so that the pigs can cool off in the mid-day heat of summer. *Pigs at pasture should have free access to clean water.*

Vitamins.

As in the case of minerals many interesting discoveries have been made since 1910 in the sphere of vitamin research. These have been of very great practical importance in human nutrition but again it is fortunate for the farmer that under commonsense conditions his live stock are unlikely to suffer from vitamin deficiency, except where young animals are being reared inside, without being allowed green foods. Then, a little cod liver oil, *of guaranteed vitamin content*, may be justified. One teaspoonful per head per day (one fluid ounce to four or five pigs) may be given in winter, or at any time to young pigs doing badly.

Pigs in well-lighted sties, on good rations, and with a small allowance of green stuff every day, are not likely to benefit from additions of special vitamin foods. Where green foods are not being fed, all pigs may benefit from the above allowance of cod liver oil.

Farrowing shelters showing automatic feeders at rear.

Fresh pasture, shade, and free access to clean water materially benefit all classes of pigs.

Milk.

Milk is an excellent food if kept *cool, fresh, and clean.* Separated milk, which is commonly used in pig-feeding, is specially valuable for all classes of pigs. Ten gallons of milk is equivalent to 7 lb. of a well-balanced ration.

Milk should never be regarded as a complete diet, as on its own it is liable to produce digestive upsets. The best results are obtained by not feeding in excess of one gallon of milk to each 2 lb. of mixed meal for young pigs, and one gallon of milk for every 3 lb. of mixed meal for older animals.

Wash the skim milk tub as often as you would your own milk jug—and keep it cool.

Examples of the Use of Potatoes (Cooked).

Cooked potatoes are a useful food when replacing crushed barley, on the basis that four parts by weight of potatoes equals one part by weight of crushed barley.

Owing to the increased bulk of the ration, potatoes are best given to pigs over four months of age, and when considerable amounts are fed it may be necessary to give three feeds daily instead of two. Although *all* the crushed barley can be replaced in this way, probably it is better not to go beyond two-thirds. For example:—

(1) *Ration B.*—Of the three parts of barley, two are to be replaced. The ration becomes—

Crushed barley	1	+ 2 x 4 potatoes (= 8 parts potatoes)
Pollard	6	
Meat meal	1	
Total	8	with 8 potatoes.

That is, use equal parts of the modified ration and potatoes.

(2) *Ration F.*—Suppose five parts of barley are to be replaced. The ration becomes—

Crushed barley	1	+ 5 x 4 potatoes (= 20 parts potatoes).
Pollard	3	
Total	4	with 20 potatoes.

Feed 14 lb. of the modified mixture with 70 lb. potatoes.

(3) *No Barley.*—It is possible to have potatoes entirely replacing barley, but if this is done a ration should be chosen containing one part of a high protein food. Thus, in place of ration D, we have—

Potatoes	6 x 4	= 24 parts.
Pollard		3 ,,
Meat meal		1 part.

This is the same as six parts of potatoes to one part of the pollard and meat meal mixture.

Swill.

A profitable way of disposing of swill is to feed it to pigs, but it is not a well-balanced ration, and is liable to become spoiled by fermentation, particularly if carelessly handled or kept for a long time. Some fermented swill may even become dangerous and produce a condition similar to the so-called food poisoning, or ptomaine poisoning, of man and other animals. All swill should be cooked. This helps to mitigate the harm done by fermentation and also removes some of the excess fat. This fat can be sold as a profitable side-line. Swill, as a rule, is deficient in meat or protein, and tends to produce soft pork, as it contains too much fat and bread.

See that sufficient trough space is provided. Pigs lose condition struggling for a feed.

Feed two parts of swill to one part of a mixture of 2 cwt. of crushed barley and 1 cwt. of meat meal.

Hand-Rearing Suckers.

If the sow is in good health and is provided with an adequate and well-balanced diet, she should be able to supply enough milk to rear a litter of reasonable size. If, however, it is necessary to hand feed suckers, the following mixture has a composition similar to that of sow's milk :—

Fresh cows' milk ..	1½ imperial pints.
White and yolk of a fresh hen's egg	About 2 oz.
Cod liver oil	½ teaspoonful.
Slaked lime or chalk ..	1 saltspoonful.

The mixture should be fed warm (i.e., blood heat, 98° Fahrenheit) four to six times per day. An ordinary child's feeding bottle can be used, but as a rule a hungry pig will readily drink from a shallow dish. All feeding utensils should be kept scrupulously clean and the mixed feed made up fresh each day.

Weaning.

By the time the sucker is about three weeks old, it is beginning to look about for extra food and will sample the contents of its mother's trough. This should be encouraged by providing a "creep" and a separate food trough.

The creep is made by fencing off a corner of the sty or yard with a slatted barricade or hurdle. The vertical spaces between the slats or pickets should be wide enough to permit the piglets to pass through but narrow enough to exclude older pigs. A small trough is placed behind this fence and from it the suckers can feed undisturbed. By this means the suckers will wean themselves, put on condition and escape the usual set-back experienced at weaning.

A similar creep filled with straw and placed in the sleeping quarters will be found very useful, particularly with heavy or clumsy sows.

Cleanliness.

Pigs are just as liable to suffer from dirty conditions as any other animal. Keep the yards, pens, troughs, &c., clean at all times, and provide dry bedding as often as necessary. This may mean every day. Straw, ferns, grass-hay, buzzer-chips (not sawdust), provide good bedding.

Wet beds and draughty sties help pneumonia to develop.

Feed Troughs.

Impervious troughs are best, but wooden troughs will do, provided they are kept clean.

Provide sufficient trough space so that all the pigs in the pen can feed at once, as a pig will lose pounds of condition struggling at the trough for a feed.

Do not let perishable foods such as milk, swill, &c., lie in the trough and ferment in the sun.

Sunlight and Rickets.

Pigs are very liable to develop rickets if they are not properly housed and fed. The affected animals fail to develop properly and their bones become weak, brittle and misshapen. Paralysis and death are the eventual termination. In order to avoid this condition, minerals *must* be fed at all times, particularly to weaners, slips and sows. Even if the diet is perfect and the necessary minerals are supplied, the pigs are liable to develop rickets if adequate space for exercise and free exposure to sunlight are not provided. *Avoid small, dark sties, which are usually damp, insanitary and cold, and favour the development of rickets and pneumonia.*

Soft Pork.

The fatty acids in the fat tissue have been shown to be divisible into two groups, termed saturated and unsaturated. In general, those forming hard fat are saturated, while those forming soft fat are unsaturated. The ideal fatty tissue of pigs is loaded with hard or

[*Continued on page 24.*

Black Disease of Sheep

A New Vaccine

By W. D. Shew, B.V.Sc., Senior Veterinary Officer

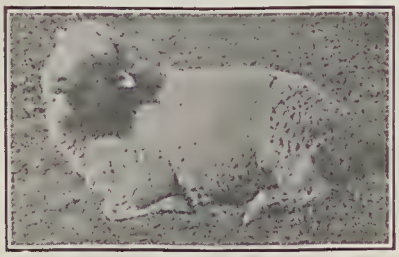
BLACK disease of sheep (*Infectious Necrotic Hepatitis*) has been known to exist in the south-eastern portion of New South Wales, in Victoria, and in Tasmania for many years, and from time to time it has engaged the attention of various eminent scientists, amongst whom one might mention the late Dr. Dodd, of the Sydney University Veterinary School, Dr. Gilruth, and more recently Dr. Albiston and Dr. Turner, of the Melbourne University Veterinary School. For many years sheep-owners in Victoria and Tasmania have called this disease "Braxy" or "Braxy-like" disease, but the use of that name has been discontinued, and the name Black disease, which was in common use in New South Wales, has been adopted in preference.

A sheep that had previously shown no signs of illness is seen lagging behind the flock on being chased by dogs.

Braxy, a fatal contagious disease of sheep in Scotland and certain European countries, does not exist in Australia, and the use of the term may lead to confusion in oversea countries, and do some damage to the sheep-breeding industry in Australia.

Black disease affects sheep of all sexes and all ages from weaners onwards; so far it has not been observed in lambs. It is caused by

the *Bacillus Oedematiens,* which will grow and multiply only in dead tissue. That fact explains why the disease is associated with the invasion of the liver by the liver fluke. When the immature fluke enters the liver through its capsule and bores its way to



An affected sheep. This animal exhibited symptoms of pain, and frequently flexed the head round to the left side.

a bile duct, it leaves behind it a track of dead tissue which provides an ideal site for the growth of this bacillus and the elaboration of its special poison. Thus the disease occurs mostly in the summer and autumn when the young fluke is most active. It is most prevalent between the months of December and June, being at its worst usually in February, March, and April, and, although the incidence steadily decreases up to June, deaths may occur at any time during the year.

Affected animals are almost invariably in quite good condition, and death occurs suddenly and without a struggle. As a rule, the body is found lying on its brisket with the

A sheep ill with black disease. Note the extended head and dilated nostrils.

legs tucked under as though the animal had died in its sleep. One very rarely sees a sheep sick with this disease; usually a few are found dead on the camp in the morning, while the remainder of the flock appear quite healthy and in good condition. Occasionally, however, if an affected flock be driven with a dog, one or more sheep will be seen to lag behind as though unable to keep up with the mob. If one of these sick sheep is forced along it will lie down on its brisket with its legs tucked under it and its head stretched out as though it is out of breath. Within a short time, varying from a few minutes to an hour, the animal will die without a struggle.

After death the carcass turns black and decomposition sets in very rapidly; therefore, a post-mortem examination, to be of any value, must be made almost immediately. This is particularly necessary if specimens are to be forwarded to a laboratory for examination. The organs of a sheep which has been dead for more than an hour will have reached such a stage of putrefaction that it becomes extremely difficult even for the scientist with all his laboratory facilities to be sure of the presence or absence of Black disease.

A sheep dead from black disease. There are no signs of struggling.

On post-mortem examination we frequently find a pale or reddish jelly-like material under the skin, especially near the brisket. When the body cavity is opened up we find in it a cupful or more of clear or blood-stained fluid, the colour depending on how long the animal has been dead. The liver will be found to be dark red and full of blood. On careful examination of the surface of the liver, we find one or more light-coloured patches. These vary in size from one-half to 2 inches in diameter; they are irregular in shape and their edges are very clearly defined, being surrounded by a thin, dark-red line. On being cut these patches are found to extend into the liver substance for some depth. On very careful search one can sometimes find an immature fluke in the light-coloured substance.

In the chest cavity we frequently find a small quantity of fluid, similar in all respects to that found in the body cavity. The most important lesion in the chest, however, is a small bag of jelly-like material surrounding the heart. This is enclosed in the pericardial

sac—that thin layer of tissue in which the heart is enveloped—and varies in quantity from two to four fluid ounces.

Farmers who are losing sheep under the conditions just described should secure a specimen from a freshly-dead sheep and forward it for examination, so that a correct diagnosis may be made. The whole of the internal organs, including the heart and lungs, should be placed in a kerosene or petrol tin and covered with a weak solution of formalin (one cupful to two gallons of water). If the bowels are too voluminous to be placed in a tin, the rumen or paunch may be discarded. All cut ends should be tied securely to prevent leaking of food material and consequent discoloration of the specimen. The tin should be soldered down and forwarded by rail to Spencer-street railway station, clearly addressed to the Veterinary Research Institute, Story-street, Parkville. When it is not possible to send all organs the liver only should be placed in a half-petrol tin covered with a weak solution of formalin and forwarded. The Director of the Research Institute should always be advised by letter of the despatch of specimens, the symptoms shown by the animal and the disease suspected. At the laboratory the organs are examined for the presence of the germ which causes the disease, or in its absence for evidence of any other disease which may be the cause of death.

Since Black disease exists only on "flukey" pastures, owners must expect to find that not all deaths amongst sheep are due to it. Sheep

The skin quickly becomes black, and the wool pulls out easily.

may die of acute fluke invasion or a heavy infestation with intestinal worms. If sheep are seen sick for several days or are in poor condition, some other disease or starvation must be suspected. Sheep which die of Black disease are almost invariably in good condition, and they die quite suddenly.

The organism which causes Black disease was first isolated in pure culture by Dr. Albiston. It was carefully and extensively studied by Dr. Turner and, as a result, a vaccine protecting sheep against the disease was developed. Recent research work at the Commonwealth Serum Laboratories has resulted in the production of a new type of vaccine which is administered in a single dose. The manufacture of this vaccine is based largely on the method originated by Dr. Turner.

Skin from the carcass of a black-disease sheep, showing the black colour.

Although the old vaccine has given excellent field results for several years, it has been shown that a single dose of the new vaccine stimulates an active immunity many times as great as that stimulated by the usual two doses of the former and, further, this immunity is sustained over a longer period. It is claimed that a very high degree of immunity is reached 14 days after injection, the maximum being reached in 21 days. In addition it has been found possible to reduce the volume of the injections from two doses of 5 c.c. each to one dose only of 2 c.c., an obvious saving of time and labour to stock-owners.

The new Black disease vaccine is obtainable from the Commonwealth Serum Laboratories, Parkville, N.2, Victoria, on presentation of a permit to supply. Such a permit is necessary before a stock-owner can vaccinate sheep on any property where Black disease is known to exist or where it can be reasonably expected to occur, and can be obtained from the Chief Veterinary Inspector, Department of Agriculture, Melbourne, C.2. The vaccine is available in the following quantities:—

	s.	d.
50 c.c. sufficient to treat 25 sheep ..	2	9
100 c.c. sufficient to treat 50 sheep ..	5	0
250 c.c. sufficient to treat 125 sheep ..	11	6
500 c.c. sufficient to treat 250 sheep ..	21	6
1,000 c.c. sufficient to treat 500 sheep ..	41	8

Full directions will be found on the labels. Once a bottle is opened it should be used immediately, but unopened containers keep quite well in a cool dark place.

Cattle also die from Black disease, and may be treated in a similar fashion to sheep, the dose being 10 c.c.

Owing to the shortage of veterinary officers on the staff, the Department is no longer able to carry out this work for stock-owners. In order to assist sheep-owners as far as possible, however, once the disease has been diagnosed on a property by examination of specimens from a recently-dead sheep, a veterinary officer will be sent, as soon as possible, in order to instruct the owner how to carry out the vaccination. The officer also will explain fully the control measures to be adopted, as these necessarily vary on different properties. The owner is required to meet the veterinary officer at the nearest railway station, convey him to his property, and return.

The owner also is required to purchase the necessary vaccine from the Commonwealth Serum Laboratories, who will, in cases of urgency, forward the required amount to the nearest railway station, cash on delivery.

Should an owner require to vaccinate his own sheep urgently, before a veterinary officer is available, a permit will be issued in approved instances, and an officer will visit as soon as available to discuss control measures, &c.

Since the liver must be injured by the young liver fluke before the germ can attack it, several avenues of prevention are open, and may be adopted either separately or conjointly. (For methods of control see liver fluke pamphlet—obtainable free from this Department.

The year's programme for control would be —vaccinate in November; spread bluestone in December and June; and drench for fluke in April, June, and July. If this programme be adhered to, both Fluke disease and Black disease would disappear from affected properties.

Vaccination does not kill the germ which causes Black disease. A sheep whether vaccinated or not may carry the germ in its liver, and may remain in apparently quite good health just so long as it is not attacked by the fluke. If the carcass of such a sheep is allowed to rot on the ground after death from any cause whatever, the germs will be spread on the pasture, and may thus gain entry to the livers of other sheep grazing over the same ground. For that reason it is advisable to destroy the carcasses of all dead sheep, and thus prevent the spread of this and many other diseases.

This precaution applies particularly to properties on which Black disease is known to exist. If it is not always possible to burn the carcass, a burial ground should be set apart and stock kept away from it at all times.

The following programme might be followed by sheep-owners with advantage:—

April (end).—Drenching.
June (middle).—Drenching.
June (end).—Bluestoning pastures.
July (end).—Drenching.
November.—Vaccination.
December (end).—Bluestoning pastures.

Stock-owners should realize also that cattle as well as sheep can contract Black disease; therefore, stocking "flukey" paddocks with cattle instead of sheep offers no solution to the problem of fluke and Black disease eradication.

Rations For Swine (*Continued from page 20.*)

saturated fats. If, however, the diet contains too great a proportion of oils, fats or certain types of starch, the fat in the pig's tissues becomes oily or soft and will not set and the carcass is useless to the bacon curer. Barley produces the hardest fat and wheat stands next. The following foods are known to tend to produce soft fat if fed in excess:—

Swill; Linseed cake or meal; Peanut, (or earth nut) cake; Maize; Pea or bean meal; Rice meal.

For this reason they should never be fed in excess of the amount stipulated elsewhere in this article.

The other factors known to tend to produce soft fat are "Lack of Finish," Immaturity, Unthriftiness and *Lack of Exercise.*

Those who require further information on this subject are recommended to consult "Pig Keeping," by W. A. Stewart, Bulletin No. 32 of the Ministry of Agriculture and Fisheries (England), and "Rations for Live Stock," by T. B. Wood and H. E. Woodman, Bulletin No. 48 of the Ministry of Agriculture and Fisheries (England). These bulletins can be obtained on order from McGill's Agency (Melbourne Agents for H. M. Stationery Office), 183 Elizabeth-street, Melbourne, C.1.

Packing Apples and Pears

Export and Local Markets

By B. P. Krone, Fruit Packing Instructor

IF Victorian apple-growers are to compete successfully on overseas markets, it is essential that they should adopt the methods of packing already in use by other large apple-producing countries. Growers in the United States of America, South Africa, and New Zealand already have demonstrated the value of the "straight" method of packing apples diagonally in the Canadian Standard fruit case, and if Victorian fruit is to meet that of our competitors on equal terms, it is necessary that we should fall into line so far as this practice is concerned.

The accompanying apple packing chart for the Canadian "Standard" case (inside measurements—18 inches long, 11½ inches wide, and 10½ inches deep) has been revised to meet the needs of the Victorian apple exporter. This has been done after careful consideration, based on experience gained in this State and on observations of the methods of packing in other parts of the world. The diagrams given are self-explanatory, and the chart indicates the methods of packing necessary to produce the various counts.

Experienced packers will notice that the commercial counts have been reduced to a minimum and, to avoid confusion, "foreign counts" are not described or shown. Any count not shown on the chart may be regarded as a "foreign count," and is not recommended for export.

Packing.

All the counts are packed on the diagonal system; but instead of the apples being placed at angles to one another, they are placed in the cases with their stalks facing in one direction with the exception of the last apples in each layer which are reversed to prevent stalk

damage, as is done with oranges. This is shown in the accompanying diagrams.

These diagrams also illustrate the "straight" method of diagonal packing which is necessary in order that the stalks will fit in the spaces between the fruit and not damage it. The last apples in each layer are reversed.

Large spaces between the fruit reduce bruising to a far greater extent than small spaces. This is one of the reasons the "straight" method of diagonal packing, which produces larger spaces in comparison with the "angle" method, is recommended. Another vital reason is the adoption of standard counts and the elimination of foreign counts, therefore:—

Remember that "angle" packs are obsolete; they produce foreign counts, and must not be used for export.

The Bulge.

It has been found from experience that the most suitable bulge across the centre of the case, before lidding, is approximately 1½ inches, while at each end of the top layer the apples should not project more than about ⅜ inch, otherwise bruising will occur in the lidding process. The bulge is obtained by selecting apples very slightly smaller than the rest for the beginning and end of each layer.

Although smaller apples should be placed at each end of each layer to create the bulge, it is particularly desirable that this practice be rigidly adopted for medium to large sized fruit, and should never be omitted from the 125 and 138 counts, otherwise severe bruising will occur in the lidding process.

Sizing.

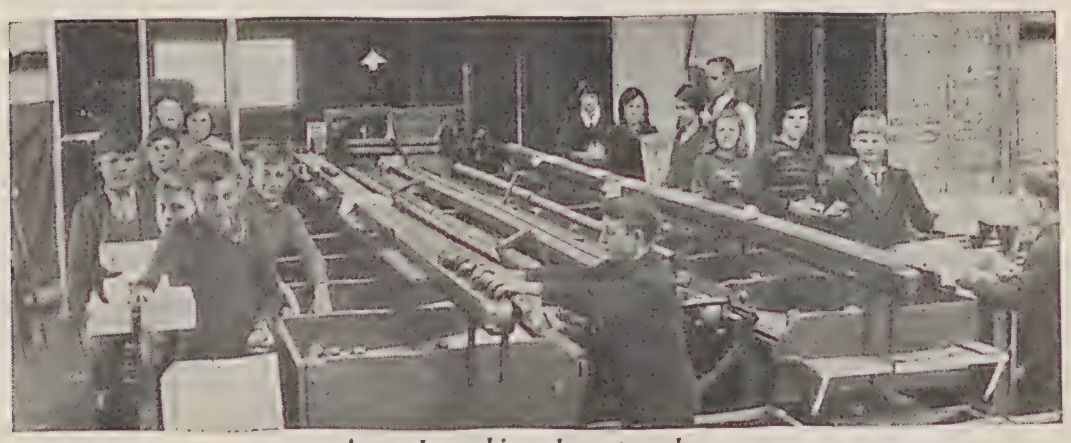
It is imperative that the counts and not the size should be branded on the ends of the cases. Remember that standardization of counts is vital when packing apples for export. *The most suitable counts for export are from* 234 *to* 125 *inclusive. The* 175 *count is an exclusive count for flat apples. Do not export Jonathans under this count.* It should be pointed out that the count is the essence of the contract, and not the diameter of the fruit. The apples in each case should, of course, be approximately one size. The packer will readily understand that the diameters must be sufficiently large to permit each case being filled to its maximum capacity, but no more.

One vital reason why sizes should not be used is as follows:—Some counts cannot be faithfully packed if sized in equal gradations of ¼ inch. Conversely, some sizes when graded to the equal ¼ inch, such as 2¼, 2½, 2¾, and 3 inches, result in slack packing and under-weight cases. For example, the 198 count, when correctly packed, should include a large number of both small 2½ inch and large 2¼ inch apples.

Incorrect packing of the 125 count also is a cause of under-weight cases arriving in the United Kingdom. Apples too small for the count are responsible.

Wire seal all cases to prevent breakage and loss in transit.

Corrugated cardboards should be used at both the top and bottom of the case. Cardboards manufactured in fast colours should be selected and placed in such a manner that the corrugations face the wood of the case and do not touch the fruit.

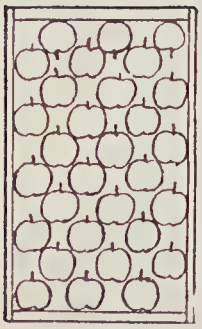


An apple-packing class at work.

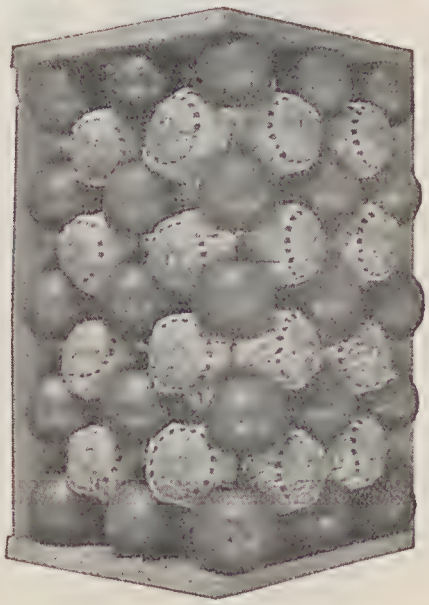
Packing Chart for the Canadian Case.

[Packing to counts and not to sizes eliminates underweight cases in the export trade.]

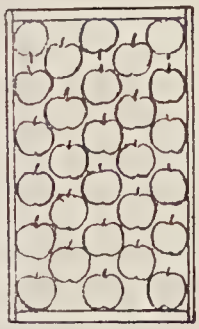
The "straight" method of diagonal packing.



3-3 Pack.



Granny Smith Apples packed in the standard case. (113 count.)



3-2 Pack.

To obtain correct counts; avoid damaged fruit and underweight cases.—Apples should be reasonably uniform in size and packed in accordance with the Rule shown in the Remarks column. To do this successfully, it will be necessary to forget the established custom of sizing in gradations of equal quarter inches. *Some counts may be between these sizes.*

Count.	Pack.	Layer.	Layers.	Remarks.
270	3-3	8 x 7	6	The correct height cannot be obtained unless the packer regulates the tightness of the pack in accordance with the size of the apples for a given style of pack. The following rule therefore should be observed:—The smallest apples intended for the 3-3 and 3-2 packs should be packed a little more tightly than usual, while the largest apples intended for these packs should be packed more loosely than usual.
252	3-3	7 x 7	6	
234	**3-3**	**7 x 6**	**6**	
216	**3-3**	**6 x 6**	**6**	
198	**3-3**	**6 x 5**	**6**	
180	**3-3**	**5 x 5**	**6**	
175 flat	**3-2 apples**	**7 x 7 only**	**5**	
163	**3-2**	**7 x 6**	**5**	
150	**3-2**	**6 x 6**	**5**	
138	**3-2**	**6 x 5**	**5**	*Special Note.*—The correct adjustment of an efficient fruit-grading machine will automatically produce in rotation in its bins each count as shown on this chart. Some machines produce two counts per bin.
125	**3-2**	**5 x 5**	**5**	
113	3-2	5 x 4	5	
100	3-2	4 x 4	5	
96 flat	**2-2 apples**	**6 x 6 only**	**4**	
88	3-2	4 x 3	5	
88 flat	**2-2 apples**	**6 x 5 only**	**4**	

The figures in heavy face type are the counts recommended for export.

Specifications of timber required for the Canadian "Standard" case:—

Ends.—2 pieces, 11½ inches long, 10½ inches wide, ⅝ inch thick.

Sides.—2 pieces, 19¼ inches long, 10½ inches wide, 5-16 inch thick.

*Tops and bottoms.—4 pieces, 19¼ inches long, 5⅓ inches wide, 3-16 inch thick.

Cleats.—4 pieces, 11½ inches long, ¾ inch wide, ⅜ inch thick.

*Tops are also cut ½ inch longer to allow for the bulge.

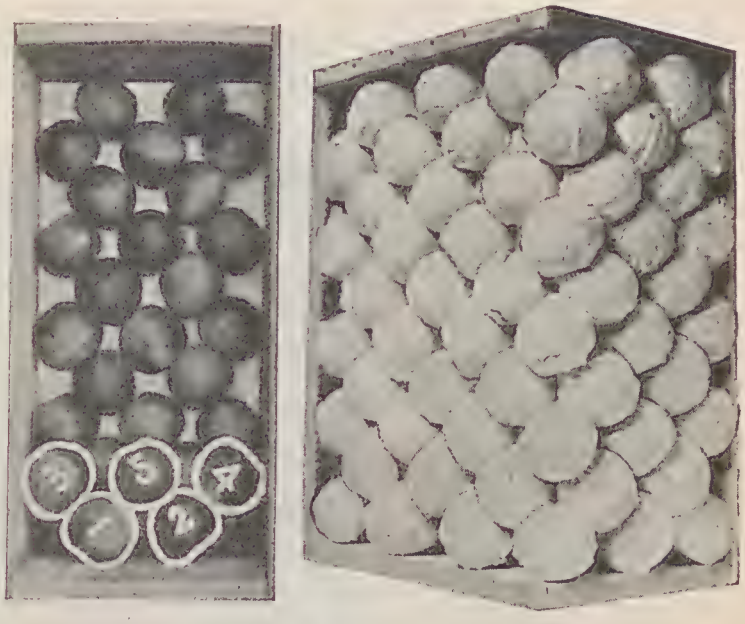
THE AUSTRALIAN DUMP CASE

No change has been made in the method of packing the Australian Dump Case. The "angle" method of diagonal packing is still recommended.

All sizes, irrespective of the pack, fit firmly but not too tightly in the Dump case. The apples should not be packed too high or too low; either is harmful, and results in bruised fruit. For the best results the top layer should project about ½ inch above the top of the case before lidding.

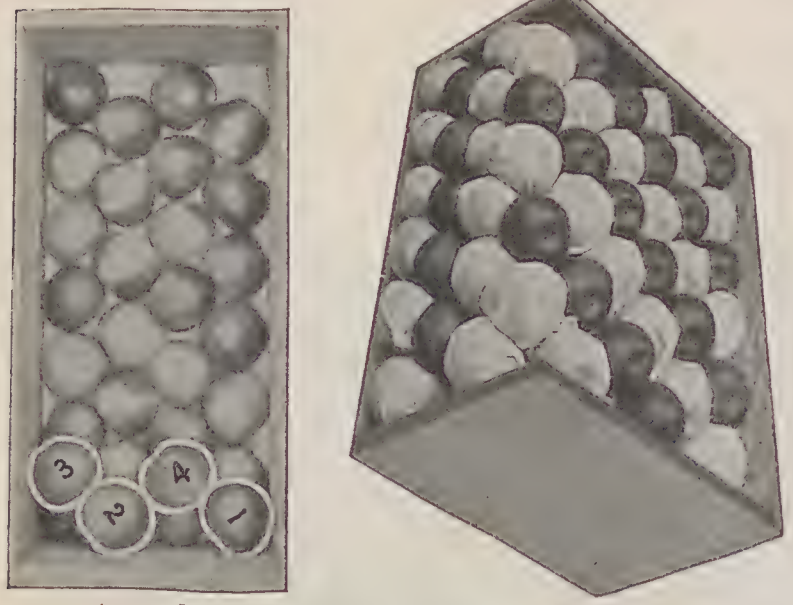
Corrugated cardboards manufactured in fast colours should be used at the top, bottom, and each side of the cases; these should be placed in such a manner that the corrugations face the wood of the case and do not touch the fruit.

Lack of uniformity in the manufacture of this case has, from time to time, been the cause of severe criticism from the export trade; therefore the specifications given on the next page should serve as a guide to manufacturers of this type of case.



The 3-2 Pack in the Dump Case.

The illustration on the left shows how to commence the first and second layers. Note the angles at which the apples are placed. The numbers show the commencement of the second layer with the apples resting on the pockets or spaces caused by the way the fruits beneath are packed. The illustration on the right shows the finished case of 2½ inch apples, 5 x 5 layer, 7 layers; Total 175.



The 2-2 Pack in the Dump Case.

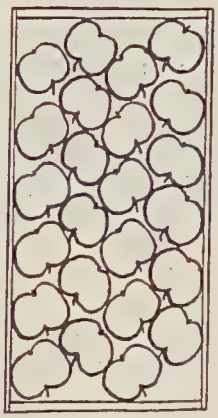
Left.—The numbers show the angles at which the apples should be placed in the first and second layers. Right.—Finished case of 2½ inch apples, 6 x 5 layer, 6 layers; Total 132.

When learning to pack the Dump Case, the beginner should observe carefully the manner in which the individual apples are placed. The diagrams on the following page illustrate the method of placing the fruit in the bottom layer. This system is known as the "angled" method of diagonal packing. Before commencing the second layer, the position of the apples marked with numbers, and shown on this page, should be studied also. Make sure the apples in each layer are drawn closely together, otherwise the finished pack will be too low. (See rule on following page.)

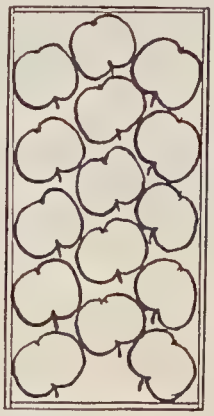
Chart for Packing Apples in the Australian Dump Case.

(Inside measurements, 18 inches long, 8⅔ inches wide, 14¼ inches deep.)

3-2 Pack.



2-2 Pack.



2-1 Pack.

Showing the method of placing apples in the bottom layer of the 3-2, 2-2, and 2-1 packs.

Correct height is obtained by adopting the following rule:—All sizes are packed firmly with the exception of 2½ inch with 175 apples, small 3 inch with 108 apples, and 3½ inch with 53 apples; these should be packed more loosely than usual.

Approximate Size.	Pack.	Layer.	Layers.	Total.	Remarks.
Inches					
2¼	3–2	8 x 8	7	280	Small flat shape
	3–2	8 x 7	7	263	Flat shapes
	3–2	7 x 7	7	245	Small quarters
	3–2	7 x 6	7	228	Medium quarters
	3–2	6 x 6	7	210	Large quarters
2½	3–2	6 x 5	7	193	Small halves
	3–2	5 x 5	7	175	Medium halves (pack more loosely than usual)
	3–2	5 x 4	7	158	Large halves
	2–2	7 x 7	6	168	Large halves—seldom used
2¾	2–2	7 x 6	6	156	Small three-quarters
	2–2	6 x 6	6	144	Medium three-quarters
	2–2	6 x 5	6	132	Large three-quarters
	2–2	5 x 5	6	120	Large three-quarters
3	2–2	5 x 4	6	108	Small to medium (pack more loosely than usual)
	2–1	7 x 7	5	105	Flat shapes
	2–1	7 x 6	5	98	Flat shapes
	2–1	6 x 6	5	90	Large 3-in.
3¼	2–1	6 x 5	5	83	
	2–1	5 x 5	5	75	
	2–1	5 x 4	5	68	
	2–1	4 x 4	5	60	
3½	2–1	4 x 3	5	53	Pack more loosely than usual

Specifications of timber required for the Australian "dump" case are as follows:—

Ends.—2 pieces, 14¼ inches long, 8⅔ inches wide, ¾ inch thick.

Sides.—6 pieces, 19½ inches long, 4⅝ inches wide, ⅜ inch thick.

Tops and bottoms.—4 pieces, 19½ inches long, 4¼ inches wide, ¼ inch thick.

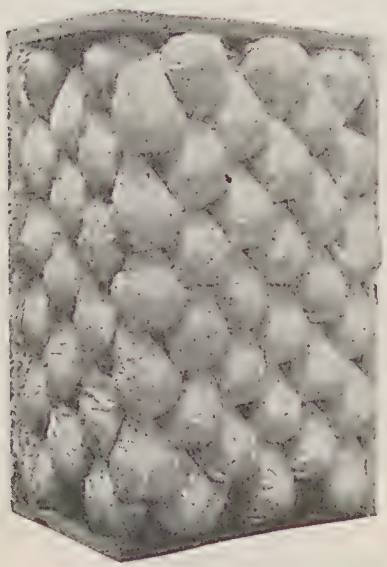
(These specifications apply only to softwood, or seasoned and dressed hardwood.)

Packing Pears for Export

The most important factor in the export of pears undoubtedly is the stage of maturity at which the fruit is harvested. Errors in harvesting are readily discernible in the Williams' Bon Chretien variety, large numbers of which are exported annually. The following hints may help in the elimination of these defects:—

The best time to harvest pears (particularly the W.B.C. variety) is indicated by—

1. The change of the ground colour of the skin from dark green to pale green.
2. The changing of the dots or lenticels from a light to a dark or corky appearance.
3. The well-filled-out appearance of the pear.
4. The ease with which the fruit can be separated from the spurs when harvesting.
5. In a pear ready for harvesting the juice immediately rushes to the surface when a slice is cut from the fruit; if it remains dry the fruit is still immature.
6. Between 14th and 24th January has proved, over a period of years, to be the most suitable harvesting period for W.B.C. pears for export.



Pears packed for export in the 8½-inch "Standard" Pear Case.

Temperatures.—Pears should remain in cool store at least 48 hours before packing; the temperature should be 29–31° F.

Temperature of the truck before loading should be 50–56° F.

The core temperature of pears at loading should be 30–35° F.

If these suggestions be followed closely the temperature of the truck upon arrival at the boat should be 40–45° F., with the core temperature of the pears between 35 and 40° F.

On no account should the temperature of Williams' Bon Chretien pears on arrival at the boat for export be more than 45° F.

Chart for pears in the 8½-in. Standard pear case (18 inches long, 11½ inches wide, 8½ inches deep—inside measurements).

Count.	Pack.	Layer.	Layers.	Remarks.
245	4–3	7 x 7	5	*Note.*—Correct height cannot be obtained unless the packer regulates the tightness of the pack in accordance with the size of the pears for a given style of pack. The following rule therefore should be observed:—The smallest pears intended for the 4–3, 3–3, and 3–2 packs should be packed a little more tightly than usual, while the largest pears intended for these packs should be packed more loosely than usual.
228	4–3	7 x 6	5	
210	4–3	6 x 6	5	
193	4–3	6 x 5	5	
180	3–3	6 x 6	5	
165	3–3	6 x 5	5	
150	3–3	5 x 5	5	
135	3–3	5 x 4	5	
120	3–3	4 x 4	5	
120	3–2	6 x 6	4	
110	3–2	6 x 5	4	
100	3–2	5 x 5	4	
90	3–2	5 x 4	4	
80	3–2	4 x 4	4	
70	3–2	4 x 3	4	

Specifications of timber required to make the standard pear case are as follows:—

Ends.—2 pieces, 11½ inches long, 8½ inches wide, ⅝ inch thick.

Sides.—2 pieces, 19¼ inches long, 8½ inches wide, 5-16 inch thick.

*Tops and bottoms.—4 pieces, 19¼ inches long, 5½ inches wide, 3-16 inch thick.

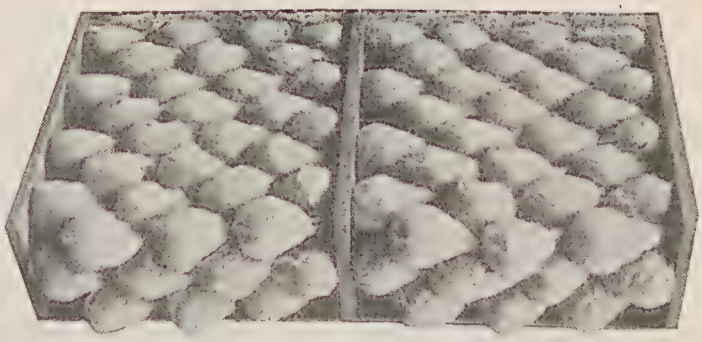
Cleats.—4 pieces, 11½ inches long, ¾ inch wide, ⅜ inch thick.

*Tops are also cut ¼ inch longer to allow for the bulge.

The 8½-inch Standard Pear Case.

The packs shown on the chart on the previous page embrace long, medium, and short varieties. They have become standardized in the markets of the world. Packs other than these are known in the trade as foreign counts. A bulge of approximately 1½ inches is necessary when packing this case, the net weight of which should not be less than 42 lb.

Sizing in the well known gradations of ¼ inch are the cause of either slack or over-filled cases and bruised fruit. It is imperative that the count and not the size should be shown on the end of the case. For this reason sizes are not shown.



Pears packed for export in the "long" bushel case.

The "long" Bushel Case.

PACKING CHART FOR PEARS IN THE "LONG" BUSHEL CASE.

(26 inches x 6 inches x 14¼ inches, inside measurements, clear of the division.)

Approximate Size.	Pack.	Layer.	Layers.	Total.	Remarks.
Inches.					
Medium and Short Types, such as Packham's, Josephine, &c.					
2	2–2	4 x 3	8	224	Normal pack
2⅛	2–1	5 x 4	8	216	Normal pack
2¼	2–1	4 x 4	8	192	Normal pack
2⅜	2–1	4 x 3	8	168	Normal pack
2½	2–1	3 x 3	8	144	Pack more loosely than usual
2⅝	2–1	3 x 3	7	126	Normal pack
2¾	2–1	3 x 2	7	106	Pack more loosely than usual
2⅞	2–1	3 x 2	6	90	Normal pack. If Howell, &c., mix 106 and 90 and pack as 96
3	1–1	4 x 4	6	96	Stalks face centre of case
3⅛	1–1	4 x 3	6	84	Stalks face centre of case
Long Types, such as Beurre Bosc, &c.					
2⅛	2–1	4 x 4	8	192	Normal pack
2¼	2–1	4 x 3	8	168	Normal pack
2⅜	2–1	3 x 3	8	144	Normal pack
2½	2–1	3 x 2	8	120	Pack more loosely than usual
2⅝	2–1	3 x 2	7	106	Pack more tightly than usual
2¾	1–1	4 x 3	7	98	Stalks face centre of case
2⅞	1–1	4 x 3	6	84	Stalks face centre of case
3	1–1	3 x 3	6	72	Stalks face centre of case
3¼	1–1	3 x 2	6	60	Stalks face centre of case

Specifications of timber required to make the "long" bushel case are as follows:—

Ends and centre—3 pieces, 14¼ inches long, 6 inches wide, 11-16ths inch thick.

Sides—6 pieces, 28 1-16 inches long, 4 11-16 inches wide, ¼ inch thick.

Lids and bottoms—2 pieces, 28 1-16 inches long, 6 inches wide, ¼ inch thick.

Branding Abbreviations—Pears.

The following varieties of pears are recommended for export :—

Beurre Hardy	B. Hardy.
,, d'Anjou	B. Anjou.
,, Bosc	B. Bosc.
Doyenne du Comice	Comice.
Glou Morceau	G. Morceau.
Josephine	Jos.
Madam Cole	M. Cole.
Packham's Triumph	Packham.
Winter Cole	W. Cole.
Winter Nelis	W. Nelis.

The following varieties of pears may be prohibited after 1937 season :—

Beurre Clairgeau	Clairgeau.
Black Achan	B. Achan.
Broompark	B. Park.

The following varieties of pears may be prohibited after 1938 season; the list will then be reviewed :—

Beurre Easter	B. Easter.
,, Britton	B. Britton.
Doyenne Bussock	Bussock.
Duchess d'Angouleme	D. D. Ang.
Giblin's Nelis	Giblin.
Howell	Howell.
Keiffer's Hybrid	Keiffer.
Marie Louise	M. Louise.
Vicar of Winkfield	Vicar.
Williams' Bon Chretien	W.B.C.
Winter Bartlett	W. Bart.

Branding Abbreviations—Apples.

Alfriston	Alf.
Cleopatra	Cleo.
Cox's Orange Pippin	C.O.P.
Crofton	Crof.
Delicious	Del.
Democrat	Dem.
Dougherty	Dhty.
Duke of Clarence	D.C.
Dunn's	Dunn's.
French Crab	F.C.
Geeveston Fanny	G.F.
Granny Smith	G.S.
Jonathan	Jon.
King David	K.D.
King Pippin	K.P.
London Pippin	L.P.
Newtown Pippin	N.T.P.
Prince Alfred	P.A.
Rokewood	Roke.
Rome Beauty	R.B.
Scarlet	S.P.M.
Statesman	Stn.
Stewarts	S.S.
Stone Pippin	S.P.
Sturmer	S.T.P.
Tasman's Pride	T.P.
Worcester Pearmain	W.P.M.
Yates	Yates.

Branding Abbreviations—Apples—contd.

The following varieties of apples will be prohibited from export after 1938 season :—

Alexander	Alx.
Aromatic	A.R.O.
Australian Beauty	A.B.
Ballarat	Bal.
Coleman	C.M.N.
Crow Egg	C.E.
Gregory's Pomeroy	G.P.
Jubilee	Jub.
Mobb's Codlin	M.C.
Nickajack	N.J.
Pomme de Neige	P.D.N.
Reinette du Canada	R.D.C.
Ribston Pippin	R.P.
Schroeder	Sch.
Stayman	Stay.
Willie Sharp	W.S.

Agricultural Lime

Brands Registered for 1937

By W. C. Robertson, Chemist.

A view of the lime works at Lilydale.

THE *Agricultural Lime Act* 1934 has for its primary objective the control of the quality of agricultural lime, whether it be in the form of oxide, hydroxide, carbonate, or any blend of the three forms, which is sold or intended to be used for application to the soil.

Every manufacturer of agricultural lime, who desires to have a brand registered, must on or before the first day of November in each year, make application to the Director of Agriculture for the registration of such brand. Where the quantity of lime sold is less than half a ton, the Act does not apply. Further the Act deals only with *agricultural lime*, which is a totally different substance from the high grade burnt and/or slaked limes used in building, in the manufacture of certain sprays and dusts or for chemical purposes in factories.

The Act is very similar to the Fertilizers Act, and provides for the labelling of bags containing agricultural lime, with labels certifying the quality of the product and giving the registered brand with the name and address of the manufacturer. At the time of sale, or before delivery, the vendor must give the purchaser an invoice certificate containing particulars similar to those on the labels attached to each bag containing the lime. Provisions are contained in the Act (Section 9), which permit the purchaser of any agricultural lime, on complying with the requirements of the regulations, to have a sample analysed by an official analyst, and to receive from him a certificate of the results of the analysis. However, purchasers, suspicious of the quality of the lime purchased, would be well advised to seek legal assistance or rely on the inspecting officers of the Department of Agriculture to make the necessary inquiries before they take action.

There are no proclaimed standards for agricultural lime in any of its forms under the Agricultural Lime Act. The manufacturer, when registering the brand, fixes his own standard of

quality, and, providing the lime, when sampled and analysed, is not proved to be deficient in calcium oxide (lime) to an extent exceeding one-twentieth (5 per cent.) of the percentage guaranteed on the invoice certificate or label, the lime is considered to be satisfactory. The same allowance is permitted in the case of the degree of fineness. This means that a brand, guaranteed to contain 40 *per cent. of lime* (calcium oxide, CaO) with 80 *per cent.* passing through a sieve having twenty holes to the linear inch, would comply with the Act, providing the

LIST OF AGRICULTURAL LIMES REGISTERED AT THE OFFICE OF THE DIRECTOR OF AGRICULTURE UNDER THE AGRICULTURAL LIME ACT 1934 (No. 4271) FOR THE YEAR 1937.

General Description.	Brand.	Calcium Oxide.	In the Form of—	Equivalent to Calcium Carbonate.	Magnesium Oxide.	In the Form of—	Degree of Fineness. Material Passing Through a 20-mesh Sieve.	Price per Ton in 11-ton Lots. £ s. d.	Manufacturer.
		%		%	%		%		
Agricultural Lime.									
Ground Burnt (unslaked)	Lilydale, No. 2	80·00	Mainly oxide	143·00	5·00	Mainly oxide	40·00	2 5 0	David Mitchell Estate, Oliver's Lane, Melbourne, C.1
" " "	" No. 1	87·70	"	156·90	5·00	"	40·00	3 0 0	David Mitchell Estate, Oliver's-lane, Melbourne, C.1
" " "	Peninsula, No. 3	73·08	"	130·10	1·28	"	98·00	3 0 0	Peninsula Lime and Fertiliser Co., 70 Elizabeth-street, Melbourne
" " "	Kawa ..	83·80	"	149·70	1·20	"	90·00	3 0 0	Alkemade Bros., 535 Little Lonsdale-street, Melbourne
Slaked Lime ..	Lilydale ..	68·00	Mainly hydroxide	121·30	3·00	Mainly hydrate	70·00	1 15 0	David Mitchell Estate, Oliver's-lane, Melbourne, C.1
" " ..	McCann's ..	60·00	"	107·00	1·10	"	80·00	1 15 0	John N. McCann Pty. Ltd., Kardinia-street, Geelong
" " ..	Tyers ..	67·70	"	120·90	1·50	"	73·00	2 0 0	Tyers Lime Works, Tyers
" " ..	White Rock ..	60·00	Hydroxide and carbonate	107·00	2·00	"	70·00	2 0 0	White Rock Lime Co. Pty. Ltd., 19 Queen-street, Melbourne
" " ..	Snowflake ..	60·00	"	107·10	1·80	"	75·00	2 5 0	Evans Bros. Pty. Ltd., Yarra Bank-road, South Melbourne
" " ..	Bulldog ..	51·80	"	92·40	·80	"	65·00	2 5 0	Bulldog Lime Co. Pty. Ltd., 344 Swan-street, Richmond, E.1
" " ..	Peninsula A.G.	56·92	"	101·60	·99	"	100·00	2 10 0	Peninsula Lime and Fertiliser Co., 70 Elizabeth-street, Melbourne
" " ..	Walker's Magic	44·80	"	80·00	3·00	Carbonate	75·00	2 10 0	David Walker, Waverley Lime Works, Lara
" " ..	Kawa ..	66·70	Mainly hydrate	119·10	1·30	"	92·00	3 0 0	Alkemade Bros., 535 Little Lonsdale-street, Melbourne
Ground Limestone or Chalk	Lilydale ..	50·00	Carbonate	89·50	3·00	"	95·00	1 2 6	David Mitchell Estate, Oliver's-lane, Melbourne, C.1
" " ..	Applim ..	51·10	"	91·20	1·20	"	98·00	1 5 0	Ammonia Products Pty. Ltd., 360 Collins-street, Melbourne
" " "	Walker's No. 1	42·00	"	75·00	2·00	"	75·00	1 5 0	David Walker, Waverley Lime Works, Lara
" " "	" No. 2	30·80	"	55·00	3·00	"	75·00	1 0 0	David Walker, Waverley Lime Works, Lara
" " "	Lara ..	42·00	"	75·00	1·50	"	80·00	1 10 0	Lara Fertiliser and Lime Co., Lara
" " "	Bulldog ..	44·80	"	80·00	·80	"	65·00	1 13 0	Bulldog Lime Co. Pty. Ltd., 344 Swan-street, Richmond
" " "	Kurdeer ..	44·80	"	80·00	·80	"	65·00	1 13 0	Curdies River Lime Co. Pty. Ltd., Curdies River, Victoria
" " "	Shellime, No. 2	33·60	"	60·00	·90	"	60·00	1 5 0	Shellime Pty. Ltd., 414 Collins-street, Melbourne
" " "	" No. 1	42·00	"	75·00	·10	"	73·00	1 15 0	Shellime Pty. Ltd., 414 Collins-street, Melbourne
" " "	Kawa ..	51·40	"	91·70	1·30	"	75·00	1 10 0	Alkemade Bros., 535 Little Lonsdale-street, Melbourne

analysis showed a content of at least 38 *per cent.* of lime (calcium oxide), and 76 *per cent.* of fine material. This allowance compares with that allowed by the Fertilizers Act in the guaranteed amounts of the three essential plant foods, nitrogen, potash, and phosphoric acid to the extent of five, five and seven per cent. respectively.

Agricultural lime is a much lower-priced commodity than artificial fertilizer, and on no account should it be considered a fertilizer. It has many good features however, and is of undoubted value under certain soil and climatic conditions, when used in conjunction with fertilizers.

Reference to the accompanying list of brands of agricultural lime will show that they are grouped under three headings, viz., ground and burnt, slaked, and ground limestone, the total registered being twenty-three. Ground burnt unslaked lime contains lime mainly in the form of oxide, and is prepared by heating limestone to a high temperature in kilns. Burnt lime is not stable and when first exposed to weather it becomes hydrated, while prolonged exposure returns it to its original condition, i.e., the carbonate and therefore, unless the physical condition of the soil is seriously at fault it would appear that ground limestone would be the most economical form to use on pastures.

Slaked lime may be regarded (with some reserve in the case of the brands of low quality) as ground burnt lime, more or less air-slaked, which contains lime mainly in the form of the hydrate which is calcium oxide combined with water. Ground limestone is "natural lime" or lime in the form of carbonate, which is the oxide combined with carbonic acid gas.

The only automatic lime kiln in operation in Victoria.

Degree of Fineness.

Although the activity of "mild" lime will depend to a certain extent upon the fineness of the powder there is a limit to the degree of fineness because, in practice, intensely ground powders provide difficulties in distribution. Generally speaking, when purchasing agricultural lime the farmer should seek the brand giving the largest percentage of calcium oxide (lime) at the lowest cost per ton, and in cases of equal merit choose the brand with the greatest percentage passing through a twenty-mesh sieve.

The degree of division of burnt lime does not matter very much, because in slaking after application fineness is obtained, while slaked or air-slaked limes are prone to be so fine as to cause trouble with the spreader.

Values for 1937.

The values of 1 per cent. of lime (calcium oxide) per ton of agricultural lime calculated from the brands registered for the current season disclose interesting figures. The dearest form of lime is the *slaked (hydrate)*. The nine brands registered give an average price of 9.15 pence for each one per cent. of calcium oxide per ton of slaked lime purchased, the variations ranging between 6.2 and 13.4 pence, therefore the brand with the lowest unit is more than twice as cheap as the brand with the highest unit.

Ground burnt agricultural lime is represented by four brands which give a calculated unit value ranging from 6.7 pence to 9.9 pence with the average figure of 8.35 pence as the value of 1 per cent. of calcium oxide per ton of this agricultural lime purchased.

Ground limestone or marl. The ten brands of "mild" lime registered give the average figure of 7.8 pence as the cost of each 1 per cent. of

calcium oxide (lime) purchased in the carbonate form per ton of agricultural lime and show figures ranging from 5.4 to 10 pence per unit of calcium oxide. The cheapest form has nearly twice the value of the dearest, and, in addition, is greatly favoured by the degree of fineness.

The essential particulars giving averages of the brands registered are summarized as follows :—

Average price of 1 per cent. of lime per ton of burnt lime—8.35 pence.

The four brands registered show an average guarantee of 81.1 *per cent. of lime*, of which 67 per cent. passes through a twenty-mesh sieve. Average price charged per ton—£2 16s. 3d.

Average price of 1 per cent. of lime per ton of slaked lime—9.1 pence.

The nine brands registered give an average guarantee of 58.4 per cent. of lime, of which 77.7 per cent. passes through a twenty-mesh sieve. Average price charged per ton—£2 4s. 5d.

Figures for ground limestone are—

Average price of lime unit	=	7·7 pence.
Average guarantee of lime	=	43·25 per cent.
Average guarantee of fineness	=	76·1 per cent.
Average price per ton	=	£1 7s. 10d.

Limestone if chemically pure would contain approximately 56 per cent. of lime (calcium oxide).

When considering the purchase of agricultural lime it is a good plan to compare the various brands, basing the comparison on the guaranteed percentage of lime and the price charged per ton, using the simple formula price per ton in pence divided by the percentage of lime, to arrive at the price charged for each 1 per cent. of lime per ton.

The following may be taken as an illustration :—

Ground Limestone—

Guaranteed to contain 50 per cent. of lime in the form of carbonate at £1 2s. 6d. per ton.

Then—

$$\frac{\text{£1 2s. 6d.}}{50} = \frac{\text{22s. 6d.}}{50} = \frac{270}{50} = 5.4 \text{ pence}$$

as the price of each 1 per cent. of lime.

This figure compares most favourably with the average price per unit for lime in the carbonate form, i.e., 7.7 pence.

When making comparisons between brands of other forms of lime it must be recognized that the forms which have passed through the kilns will always show the greatest price per unit because of the extra cost of handling and treatment.

Fertilizers Act

Prosecution for Offences

At the Echuca Court of Petty Sessions on 8th December, Messrs. W. Pridham Pty. Ltd., who pleaded guilty were fined £1 for exposing for sale, blood and bone fertilizer in bags not having attached the necessary labels required by the *Fertilizers Act* 1928. Defendant was fined a further sum of £10 for selling a fertilizer which did not have a brand registered with the Director of Agriculture. Costs totalling £8 3s. 9d. were allowed against defendant.

At the Court of Petty Sessions, Shepparton, on the 4th December, 1936, before Mr. F. E. Williams, P.M., and local Justices, The Goulburn Valley Freezing Works was charged with an infringement of the *Fertilizers Act* 1928, in that a sample which was withdrawn from a blood and bone fertilizer found at the works, when analyzed, showed percentage deficiencies far in excess of those permitted under the Act. It was stated in evidence that the value per ton calculated on the guarantee by the unit value system was £8 14s. 10d.; whereas the value calculated on the analysis of the sample as found was £6 4s. 8d., only.

Mr. W. Nunan of the Crown Law Department appeared for the Department of Agriculture, and Mr. J. R. O'Keefe for the defendant. A conviction was recorded, the defendant being fined the maximum penalty of £5 with £4 3s. 6d. costs.

Oriental Peach Moth

Investigations in the Goulburn Valley

The following report was prepared by the Oriental Peach Moth Investigations Committee

THE Oriental Peach Moth has caused serious losses to the canned peach industry of the Goulburn Valley during the past few years. In the season 1933–34 a serious outbreak occurred. In the subsequent season the loss was 20 to 28 per cent., but in the 1935–36 season the loss was estimated at 50 to 52 per cent., which was almost as serious as the outbreak of 1933–34. It would thus seem that heavy infestation has become normal and that outbreaks are unlikely to be merely sporadic. The losses are in fact so great that they threaten the existence of the canned peach industry.

Although peaches are the chief fruits attacked by the moth, almond fruit and twigs, apricot fruit, plum twigs, pears, and quinces may be attacked also. The larvae of the first and second broods cause extensive damage to young succulent tips, a single larva attacking three tips in the course of its feeding period. The larvae of the third and fourth broods attack the fruit. Injury to quinces and late season's growth on young peaches and almonds is caused by the fifth brood larvae.

In 1934 the Commonwealth Bank and the Canned Fruits Control Board provided funds for an investigation of this pest, which has since been carried out by an officer of the Council for Scientific and Industrial Research in association with the Victorian Department of Agriculture (see this *Journal*, August, 1935, page 365).

The ideal method of control of any pest is by means of a natural enemy. In certain parts of the United States of America the Oriental peach moth is effectively controlled by parasites, and, through the generosity of the United States Department of Agriculture, two kinds of parasites, believed to be the most efficient, were first introduced into Australia towards the end of the year 1935. They were bred in quarantine insectaries at Canberra and liberated in the Goulburn Valley.

The parasites in question are known as *Macrocentrus ancylivorus* and *Glypta rufiscutellaris*. Both lay their eggs on the larvae of the peach moth, which are ultimately destroyed by the parasites. It must be pointed out, however, that even in some parts of the United States of America, these parasites have failed to control the Oriental peach moth, and there is reason to suspect that the conditions in the Goulburn Valley may not be suitable for them. For instance, *Macrocentrus ancylivorus* is very sensitive to low humidities and high temperatures, while *Glypta rufiscutellaris* requires an alternative host, which lives in a weed, to carry it over part of its life cycle.

Another consignment of the two parasites will reach Australia from America very shortly, and further endeavours will be made to breed and liberate them in large numbers throughout the affected district during the present season. The parasites will be given the best possible chance to establish themselves, but beyond this nothing can be done to assist them to control the Oriental peach moth, and the fact must be faced that they may not be able to control the moth. Therefore, concurrently with work on the parasites, investigations are being carried out to determine if there is any other possible method of controlling the pest.

Experiments have been conducted with a large number of different insecticides to find a substance which will destroy both the eggs and the young caterpillars. These two stages are the only ones which can be reached by spray materials. More detailed experiments will be carried out during the coming season with certain of the insecticides which have shown promise. Much work along similar lines has been carried out overseas, particularly in the United States of America, but so far no satisfactory spray schedule has been evolved. The special difficulty is due to the habits of the larvae and the vigorous growth of the peach. New tissues are rapidly produced throughout the season, so that cover sprays cannot long remain effective. The rapid production of new growth and the variation in the time of brood emergences in different orchards throughout the district make it necessary to time very accurately the application of sprays, so that each spray is applied at a time when the vulnerable stages of the insect are present. How-

[*Continued on page* 42.

Manurial Trials on Potatoes

Results for 1935-36

By J. T. Ramsay, Potato Expert.

The results of the experiments at Beech Forest, Trentham, Wheatsheaf, Romsey, Musk, Warragul, Koroit, and Illowa were published in the November 1936, issue of this Journal.

MILLBROOK.

THE tests at Millbrook are of particular interest, as many other experiments, in addition to the manurial trials, are conducted. These include "Green Manurial," "Cultivation," Seed Selection," "Immature and Ripe Seed," "Storage," and "Dipping" tests.

The comparative yields from the various manurial trials at Millbrook for the past season showed a marked response in favour of the mixture of superphosphate and ammonium sulphate, the percentage increase being much greater than the average percentage increase obtained over the nine years of the tests.

A dressing of 2 cwt. of sulphate of ammonia per acre, in addition to superphosphate, has been given to some of these plots during the past four years. The results so far indicate that the extra 1 cwt. of nitrogenous fertilizer is not justified, the outstanding manurial dressing at Millbrook being 3 cwt. superphosphate and 1 cwt. sulphate of ammonia per acre.

Last season the three and one mixture gave the phenomenal increase over the "no manure" yield of 140 per cent. of marketable tubers, while the average increase for the nine years of the tests is 114 per cent. The yields obtained at Millbrook are set out in Tables I. and II.

TABLE I.—MANURIAL TRIALS, MILLBROOK, 1935–36.

Manure per Acre.	Weight Marketable Tubers.	Increase due to Manure.	Percentage Increase.
	T. C.	T. C.	%
Super., 2 cwt. ..	6 18	3 3	84
Super., 3 cwt. ..	7 12	3 17	103
Super., 4 cwt. ..	7 1	3 6	88
No manure	3 15	..	..
Super., 3 cwt. + amm. sulp., 1 cwt. ..	9 0	5 5	140
Super., 3 cwt. + amm. sulp., 2 cwt. ..	8 17	5 2	136
Super., 3 cwt. + amm. sulph., 1 cwt. + pot. sulph., 2 cwt. ..	7 15	4 0	107

TABLE II.—AVERAGE RESULTS, MILLBROOK, FOR NINE YEARS, 1927–28 TO 1935–36.

Manure per Acre.	Average Yield.	Percentage Increase.
	T. C.	%
Super., 2 cwt.	4 12	59
Super., 3 cwt.	5 3	78
Super., 4 cwt.	5 0	71
No manure	2 18	..
Super., 3 cwt. + amm. sulp., 1 cwt.	6 4	114
Super., 3 cwt. + amm. sulp., 2 cwt.	7 10	97*

* For four years only.

Green Manurial Test.

For the past three years, tests of the effect of green manure on the yield of potatoes have been conducted, at Millbrook, with remarkably good results. The green crop used has mostly been rye, this cereal being chosen because of its ability to produce such a bulk of greenstuff. Its effect has been twofold. Not only has the plant-food content of the soil been increased but also the physical condition of the soil has been improved, resulting in a better moisture-holding

TABLE III.—AVERAGE RESULTS, "GREEN MANURE VERSUS BARE FALLOW" TEST, MILLBROOK, 1935–36.

Manure per Acre.	Bare Fallow.	Green Manure.	Percentage Increase.
	T. C.	T. C.	%
Super., 3 cwt. ..	4 14	7 12	62
Super., 3 cwt. + amm. sulp., 1 cwt. ..	6 7	9 0	42
No manure	2 15	3 15	36

TABLE IV.—AVERAGE RESULTS, MILLBROOK, FOR THREE YEARS, 1933-34 TO 1935-36.

Manure per Acre.	Bare Fallow.	Green Manure.	Percentage Increase.
	T. C.	T. C.	%
Super., 3 cwt. ..	5 3	6 19	35
Super., 3 cwt. + amm. sulp., 1 cwt. ..	5 14	8 9	48
No manure	2 9	3 7	57

capacity. This has been reflected in an increased yield of crop and a better shaped potato.

Much of the volcanic soil in the central highlands of the State has been under cultivation so long that the humus content has been depleted seriously. No cheaper and more effective method than green manuring can be adopted for reconditioning such land.

The figures in Tables III. and IV. indicate the beneficial results obtained by this sound practice.

Cultivation Test.

The cultivation tests again indicated the benefit to be gained from sufficient inter-cultivation of the potato crop. The results obtained over a period of ten years have been most consistent. (See also Warragul trials, November Journal.)

TABLE V.—CULTIVATION TESTS, MILLBROOK, 1935-36.

	1935-36.		Average for Ten years 1926-27 to 1935-36.	
	Weight Marketable Tubers.	Percentage Increase.	Average Yield.	Percentage Increase.
	T. C.	%	T. C.	%
One cultivation	7 12	..	4 16	..
Two cultivations	8 6	9	5 19	24
Three cultivations	9 0	18	6 18	44

Irrespective of seasonal conditions the average increase has been approximately one ton of marketable tubers for each additional horse hoeing. Considering the low cost of this operation—one man and one horse can do from three to four acres per day—it is obvious that ample inter-cultivation is a sound investment.

The details of weights obtained from the cultivation trials are shown in Table V.

Seed Selection.

Marked increases in yield continue to be shown by seed saved from selected plants as compared with seed from the run of the crop. Last season the improvement amounted to 21 per cent., and for the past ten years an average increase of 33 per cent. has been obtained from the use of selected seed.

TABLE VI.—SEED SELECTION TESTS, MILLBROOK.

	1935-36.		Ten years' average 1926-27 to 1935-36.	
	Weight Marketable Tubers.	Percentage Increase.	Average Yield.	Percentage Increase.
	T. C.	%	T. C.	%
Un-selected seed	5 10	..	6 2	..
Selected seed ..	6 13	21	8 2	33

Selected seed is harvested only from plants giving a satisfactory yield of clean and good-type tubers. Not only is this one of the best means of maintaining a variety, but prolificacy also is improved. Since seed selection obviously is sound practice it is hard to understand why it is not adopted more generally. It would be a simple matter for growers to plant, each year, a small stud plot from which supplies for future use could be drawn. The improvement gained would amply justify the little extra trouble involved.

The results obtained during the 1935-36 season and the average results for the past ten years are shown in Table VI.

Immature and Ripe Seed.

The increased tonnage to be obtained from the use of immature as against ripe seed was demonstrated again during last season's tests at

TABLE VII.—IMMATURE AND RIPE SEED TESTS, MILLBROOK, 1935-36.

	1935-36.		Average for Six years 1930-31 to 1935-36.	
	Weight Marketable Tubers.	Percentage Increase.	Average Yield.	Percentage Increase.
	T. C.	%	T. C.	%
Ripe seed ..	5 9	..	5 8	..
Immature seed	6 7	16	6 12	22

Millbrook. The greater vigour of the unripe seed resulted in an extra yield of 18 cwt. per acre, which is equal to 16 per cent. Over a period of six years an average increase of 22 per cent. has been obtained by the use of immature seed. The figures relating to this test are set out in Table VII.

In harvesting potatoes for seed the degree of immaturity at which they should be secured may be determined from the colour of the foliage. If dug when the leaves commence to turn yellow, but little weight of crop is sacrificed and the requisite condition is obtained.

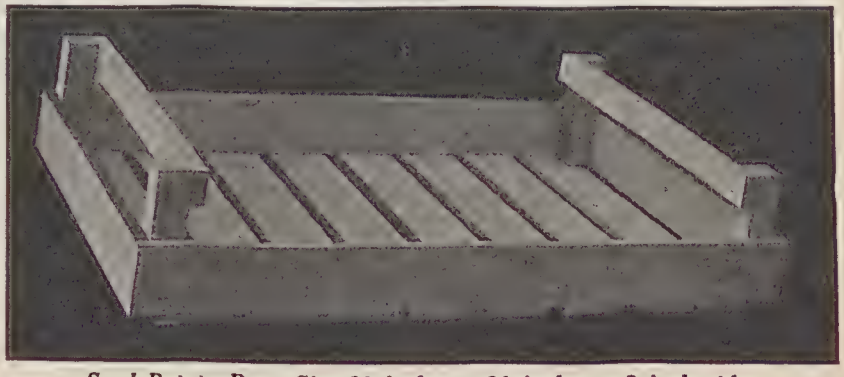
Seed Storage.

The importance of correct storage is particularly evident from the yield figures obtained from the storage test. It is absolutely essential that seed in storage should have ample air and light so that its vitality may not be impaired. Boxing is the ideal system and, although the initial cost may be somewhat heavy, the increased yield obtained over a few years will more than compensate a grower for this outlay. With careful handling the seed boxes will last for many years, so that their cost cannot be charged against one year's crop.

TABLE VIII.—BOXED VERSUS BAGGED SEED, MILLBROOK, 1935-36.

	1935-36.		Ten years' average 1926-27 to 1935-36.	
	Weight Marketable Tubers.	Percentage Increase.	Average Yield.	Percentage Increase.
	T. C.	%	T. C.	%
Bagged seed ..	3 18	..	3 6	..
Boxed seed ..	9 0	129	6 8	94

A standard seed potato box is shown in the accompanying illustration, while the yields obtained during the 1935-36 season and the average of those for the past ten years at Millbrook are set out in Table VIII.



Seed Potato Box—Size 31 inches x 21 inches x 3 inch sides

Dipping Tests.

The dipping of potato seed in a solution of formalin has proved effective in the control of certain potato diseases. If seed is treated prior to sprouting the strength of the dip recommended is 1 lb. of formalin to 20 gallons of water. If sprouting has taken place a more dilute solution should be used, viz., 1 lb. to 30 gallons.

The results obtained continue to be striking, there being, last season, an increase of 87 per cent. in favour of dipped seed, the increased yield being due to the disease-controlling influence of the formalin.

The cost involved is small, and as the practice of dipping is highly desirable it is strongly recommended. The results are shown in Table IX.

TABLE IX.—FORMALIN DIPPING TESTS, MILLBROOK, 1935-36.

	1935-36.		Average for six years 1930-31 to 1935-36.	
	Weight Marketable Tubers.	Percentage Increase.	Average Yield.	Percentage Increase.
	T. C.	%	T. C.	%
Un-dipped seed	4 3	..	3 18	..
Dipped seed ..	9 0	117	7 6	87

Brown Coal.

For the past three years brown coal dust has been tested out at Millbrook and Warragul at the rate of 6 tons and 12 tons per acre. At Millbrook these trials have been conducted in conjunction with the "Green Manure and Bare Fallow" tests.

The results obtained have not shown any significant increase, and in view of the high cost

involved in handling such large quantities it has been decided to discontinue these tests.

TABLE X.—BROWN COAL DUST TESTS, MILLBROOK, 1935–36.

Manure per Acre.	Manure only.	Brown coal dust on Green Manurial Trial.	
		6 tons per acre.	12 tons per acre.
	T. C.	T. C.	T. C.
Super., 2 cwt. ..	6 18	7 4	6 4
Super., 3 cwt. ..	7 12	7 9	7 1
Super., 4 cwt. ..	7 1	7 12	7 7
No manure	3 15	3 15	3 9
		Brown coal dust on bare fallow.	
Super., 3 cwt. ..	4 14	5 5	5 0
Super., 3 cwt. + amm. sulp., 1 cwt. ..	6 7	8 0	7 12
No manure	2 15	2 15	2 15

The results obtained at Millbrook are shown in Table X., while the average yields for three years at Millbrook and Warragul are set out in Table XI. The 1935–36 results for Warragul appeared in the November 1936, issue.

TABLE XI.—BROWN COAL DUST TESTS—THREE YEARS AVERAGE (1933–34 TO 1935–36) OF ALL MANURIAL VARIATIONS.

—	No dust.	6 tons per acre.	12 tons per acre.
	T. C.	T. C.	T. C.
Millbrook.			
Average—All manures	6 2	6 1	6 3
Warragul.			
Average—All manures	5 0	5 3	5 2

FISH CREEK.

The response from manuring potatoes at Fish Creek was very marked again last season, the yield from the super. and ammonia plots being twice that of the "no manure" areas.

The "6 and 1" mixture again proved the most economical fertilizer to use at Fish Creek. This manurial combination has given very consistent results since it was first used. A further plot of 6 cwt. super. and 2 cwt. ammonium sulphate has been included in these trials during the past four years, but no material benefit has been evident from this additional quantity of nitrogenous fertilizer.

TABLE XII.—POTATO MANURIAL TRIALS, FISH CREEK, 1935–36.

Manure per Acre.	Weight Marketable Tubers.	Increase due to Manure.	Percentag Increase.
	T. C.	T. C.	%
Super., 3 cwt. ..	9 8	3 18	71
Super., 4½ cwt. ..	9 13	4 3	75
Super., 6 cwt. ..	9 13	4 3	75
No manure	5 10	..	..
Super., 6 cwt. + amm. sulp., 1 cwt. ..	11 0	5 10	100
Super., 6 cwt. + amm. sulp., 2 cwt. ..	11 0	5 10	100
Super., 6 cwt. + amm. sulp., 1 cwt. + pot. sulp., 1 cwt. ..	10 9	4 19	90

An excellent sample of potatoes was dug at Fish Creek last season, where also some of the highest yields of the State were obtained.

The yields obtained during last season are shown in Table XII., while the average yield of the various manures over the period of the trials are set out in Table XIII.

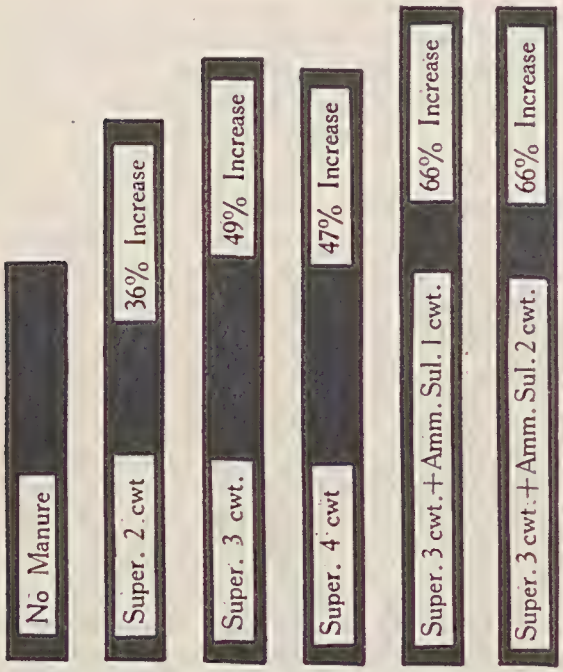
TABLE XIII.—AVERAGE RESULTS, FISH CREEK, FOR EIGHT YEARS, 1928–29 TO 1935–36.

Manure per Acre.	Average Yield.	Percentage Increase.
	T. C.	%
Super., 3 cwt.	7 0	48
Super., 4½ cwt.	6 11	72*
Super., 6 cwt.	7 11	60
No manure	4 14	..
Super., 6 cwt. + amm. sulp., 1 cwt.	8 3	73
Super., 6 cwt. + amm. sulp., 2 cwt.	8 6	78†
Super., 6 cwt. + amm. sulp., 1 cwt. + pot. sulp., 1 cwt.	7 9	58

* Two years only. † Four years only.

VOLCANIC SOILS.

The increases from manures on the volcanic soils throughout the State continue to be striking. The most significant and consistent improvement in yield has been obtained at all these centres from the use of 3 cwt. super. and 1 cwt. sulphate of ammonia per acre, the well known "3 and 1" combination. Over a range of 56 tests this mixture has given a 66 per cent. greater yield than that of the "no manure" areas.



Showing average results at seven volcanic soil centres (see Table XIV.) over the period 1927–28 to 1935–36.

Four years ago a dressing of 2 cwt. ammonium sulphate per acre, in conjunction with superphosphate, was introduced on these volcanic soils and although, in a few cases, there has been an increased yield, it has not been sufficient to justify the cost of the extra 1 cwt. of nitrogenous fertilizer. From the data available it can be accepted that the "3 and 1" mixture, at the rate of 4 cwt. per acre, is the most profitable manure to apply to the potato crop on practically all of the volcanic areas of the State.

A summary of the results obtained is set out in Table XIV., while the accompanying graph shows at a glance the comparative yields given by the various fertilizer treatments. All manures have been applied over a period of nine years, with the exception of the "3 and 2" mixture, which has been used for four years only. It should be stated also that one or two seasons at the beginning of the nine-year period were very dry ones, resulting in low yields.

The seven centres at which these tests have been conducted are as follow:—Millbrook (Ballarat), Romsey, Koroit, Illowa, Trentham East, Musk, and Wheatsheaf (Daylesford).

TABLE XIV.—POTATO MANURIAL TRIALS.—AVERAGE RESULTS ON VOLCANIC SOILS AT ROMSEY, WHEATSHEAF, MUSK, MILLBROOK, KOROIT, ILLOWA, AND TRENTHAM EAST, 1927–28 TO 1935–36.

Manure per Acre.	Average Yield.	Number of Tests.	Percentage Increase.
	T. C. Q.		%
Super., 2 cwt. ..	5 5 2	56	36
Super., 3 cwt. ..	5 15 1	56	49
Super., 4 cwt. ..	5 13 2	56	47
No manure	3 17 1	56	..
Super., 3 cwt. + amm. sulp., 1 cwt. ..	6 8 2	56	66
Super., 3 cwt. + amm. sulp., 2 cwt. ..	6 13 2*	26	66

* Since 1932–33 only.

Oriental Peach Moth

(*continued from page 37*).

ever, the work in the Goulburn Valley has shown sufficient promise to warrant continuance of the study of insecticides.

This year the Commonwealth Bank (from their Rural Credits Development Fund) and the Canned Fruits Control Board have provided between them a total sum of £3,500, in order that an intensive programme of work may be carried out during the next two seasons. More equipment has been obtained, including a new insectary specially constructed at Mooroopna for parasitic breeding, and additional staff will be employed. Thus fully equipped, a team of investigators is making every effort to obtain as quickly as possible a satisfactory and economic method of control of the pest.

Artificial Fertilizers Registered for 1937

Analyses and Unit Values

By W. C. Robertson, Chemist

AN Act to regulate the sale of fertilizers was first placed on the Victorian Statutes in 1897. This Act was amended on several occasions until in 1928 it was re-drafted to its present form and consolidated in 1929. Although serious infringements are from time to time detected, and proceedings instituted against the manufacturer or vendor concerned, the most useful purpose of the Act has been in controlling the quality of artificial fertilizers sold to the farmer.

The raw material from which superphosphate is manufactured, Ocean Island.

Under the Act "fertilizer" means any substance containing nitrogen phosphoric acid or potash manufactured or prepared in any manner for the purpose of fertilizing the soil or supplying nutriment to plants. The term does not include farmyard or stable manure or any crude nightsoil, crude offal, or other unmanufactured refuse. The Act does not apply to the sale of any fertilizer where the quantity sold is less than half-a-hundredweight.

On or before the first day of November every year, it is necessary for every manufacturer or importer of fertilizers to make application in writing to the Director of Agriculture to have a brand registered in respect to every fertilizer he intends to sell during the year. A fee of one guinea must accompany each application, with a maximum fee of five pounds in the case of any single manufacturer.

Among the particulars which must be supplied with every application, is included the guarantee as to quality, i.e., a chemical analysis stating the percentages of nitrogen, phosphoric acid, and potash, in the form in which they occur in the fertilizer. The retail price of the fertilizer per ton at the railway station nearest the place of manufacture must be given also. A heavy penalty is provided for selling fertilizer in respect of which no brand is registered. Every bag containing fertilizer must be branded with the registered brand and a label must be affixed with the following particulars plainly printed thereon (1) the name and address of the manufacturer or importer, (2) the registered brand including a chemical analysis of the fertilizer, and (3) the number of pounds net weight in the parcel. Further, at the time of sale or before delivery the vendor of any fertilizer must give to the purchaser a duly dated and signed invoice certificate in the prescribed form, which is a warranty as to quality and weight.

From the above it will be recognized that only fertilizers that comply with these provisions should be purchased by the farmer. This assists to an appreciable extent in reducing to a minimum the risk of distribution of fertilizer of inferior quality.

From the registered brands and retail prices per ton of the various simple fertilizers the chemist of the Department of Agriculture annually computes the unit values of the three plant foods, viz., nitrogen, phosphoric acid, and potash in the

Showing a phosphate deposit running underneath the virgin forest—Ocean Island.

forms in which they occur in the fertilizers. The unit value of any of these plant foods or any of their forms is the average commercial value of 1 per cent. per ton. For example, the unit value of water soluble phosphoric acid is the average price charged by the manufacturer for each 1 per cent. of water soluble phosphoric acid in every ton of the fertilizer superphosphate. The unit value system is of great importance to the farming community when comparing brands of fertilizers and their retail prices, because by simple calculation it is possible to compute the average market value of a ton of any brand and thus ascertain which brand of the fertilizer will give the best value.

The unit values calculated for the current year disclose little variation from those of last year, excepting in the case of organic and ammoniacal nitrogen, phosphoric acid in bonedust, and both forms of potash, all of which have higher values, the increases amounting to approximately 10 per cent. in the case of potash and bone phosphate and 3 per cent. in the case of nitrogen in the forms stated. The unit value of nitrogen as nitrate shows a small decrease of approximately 3 per cent. compared with that of the previous year.

The shortage of certain animal fertilizers during the past year, due to an expansion in the export trade, was followed by an increase in local prices, and this may account for the increase in the unit value of organic nitrogen, while the increased demand for bonemeal as a stock lick and food, explains the increased unit value for bone phosphate.

Calculation of Values.

To calculate the value of a fertilizer by the unit value system, mulitply the percentage of plant food by the unit value figure. The following may be taken as an example, not only of the method, but also of its value to the farmer when buying blood and bone. Two brands of blood and bone, A and B, have the following analyses and prices per ton :—

—	Nitrogen.	Phosphoric Acid.		Total.	Price per ton.
		Citrate Soluble.	Citrate Insoluble.		
	per cent.	per cent.	per cent.		£ s. d.
Brand A.	5·0	4·0	10·0	14	7 10 0
Brand B.	6·0	6·0	6·0	12	7 10 0

Which brand will give the best value for the money ?

BRAND A.

	s. d.	£ s. d.
5 per cent. nitrogen × 18s. 8d. (unit value)	= 93 4	= 4 13 4
4 per cent. phosphoric acid (citrate soluble) × 4s. (unit value) ..	= 16 0	= 0 16 0
10 per cent. phosphoric acid (citrate (insoluble) × 3.s 6d. (unit value)	= 35 0	= 1 15 0
Calculated value per ton		.. 7 4 4

PUMPS FOR ALL PURPOSES

We recommend—

For distance pumping or irrigation:
"Macson" Piston Pump
(Sizes from 1¼ to 3 inch), or
"Ajax" Lift and Force Hand Pump
(Size 1¼ inch).

For pumping a large volume of water at low pressure:
"Super-Rapid" Centrifugal Pumps.
Single, Two, or Multi-stage
(Sizes from ¾ to 5 inch).

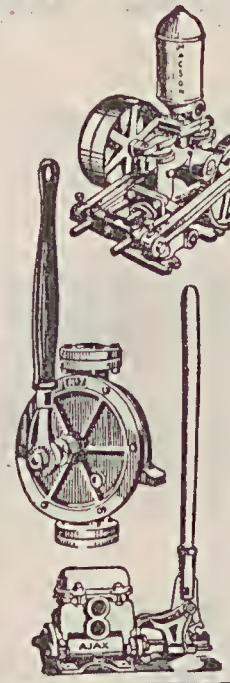
For Fire-Fighting:
"Ajax" Fire-Fighting Pump
(Size 1¼ inch).

For Continuous, Automatic Pumping:
"Reliance" Hydraulic Ram.

For Spraying and Dusting:
"Rega" Spraying Equipment.

Full particulars of these and other Pumps on application.

Our illustrated Pump Catalogue will help you. You will find details of these and many other pumps. Send for your free copy. Post free anywhere.



The "Macson" (*top illustration*) is a powerful double-acting Piston Pump, that will pump up to 100 lbs. pressure or 250 ft. elevation. A fine pump for irrigation or general water supply. Sizes range from 1¼ to 3 inches, with prices from £15 to £48.

"Rota" Semi-Rotary Pump (Centre) This is a medium-capacity pump which is specially suitable for pumping oils and petrol. All the inner working parts are of brass. Sizes from ½ to 2 inch. Prices from 25/- to 97/6.

"Ajax" Double-acting Low Down Lift and Force Hand Pump (*lower illustration*). The long handle and cog-gear give great leverage and reduce power required to operate. For general pumping, spraying, irrigation. Size 1¼ inch. Capacity 500 gallons per hour. Price £3/17/6.

McPherson's
Proprietary Limited

546 COLLINS ST., MELBOURNE
and at
SYDNEY, ADELAIDE, PERTH.

BAYER

'CERESAN'

BAYER'S DRY SEED DRESSING
(U.T. 1875 a) TRADE MARK

BRITISH MADE

The BETTER DRY SEED DRESSING for BIGGER & BETTER CROPS

'CERESAN' gives:—

BETTER GERMINATION

BETTER CONTROL OF DISEASES

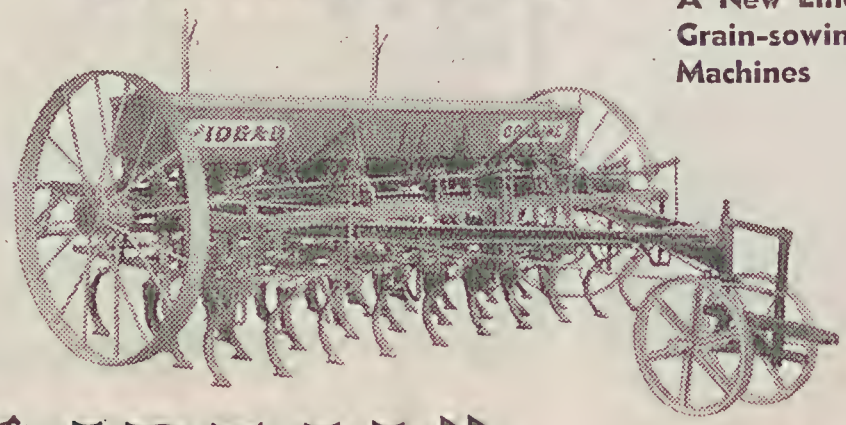
BIGGER YIELDS OF A BETTER TYPE OF GRAIN

'CERESAN' MAY BE USED IN AN ORDINARY DRY PICKLER	**'CERESAN' is fully effective for WHEAT, BARLEY, OATS and ALL CROP SEEDS.**	**'CERESAN' COSTS LESS THAN 5d. PER ACRE**	**'CERESAN'-treated seed does not Clog or Block Drills.**	***ORDER NOW!*** **Distributors: DALGETY & COMPANY LTD.** (Incorporated in England) **MELBOURNE, C1.**

INTERNATIONAL HARVESTER

Announces . .

A New Line of Grain-sowing Machines

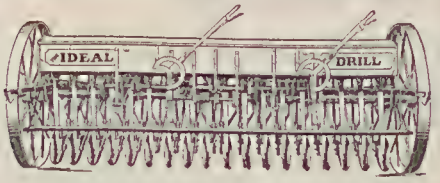


"THE IDEAL"

DRILLS AND CULTIVATOR DRILLS

HERE is a new line of drills and combines embodying the latest mechanical and constructional improvements — with many quality features which make them just the type of machines you need to insure complete success in your sowing operations.

Made in 9, 12, 15, 18, and 21-row sizes, "Ideal" drills are available in disc and hoe types, while "Ideal" combines can be supplied with either spring, rigid, or spring-release rigid tines. Both machines can be equipped for operation with horses or tractor.



This is "The Ideal" disc drill. Built in 9, 12, 15, 18, and 21-row sizes. Can be equipped for operation with horses or tractor.

Call and see your local agent at the first opportunity and ask him about these "Ideal" drills and combines, or write us for catalogue. You will want to know more about these new International Harvester machines before you start your drilling.

INTERNATIONAL HARVESTER COMPANY OF AUSTRALIA PTY. LTD.

(INCORPORATED IN VICTORIA)

543-555 BOURKE STREET, MELBOURNE, C.1.

Z2252D

BRAND B.

	s.	d.	£	s.	d.
6 per cent. nitrogen × 18s. 8d. (unit value) .. .. =	112	0 =	5	12	0
6 per cent. phosphoric acid (citrate soluble) × 4s. (unit value) .. =	24	0 =	1	4	0
6 per cent. phosphoric acid (citrate insoluble) × 3s. 6d. (unit value) =	21	0 =	1	1	0
Calculated value per ton			7	17	0

It is clear from the above that Brand B is more valuable than Brand A, to the extent of twelve shillings and eightpence per ton.

The unit values for 1937 are published in this Journal (page 46), and appear annually in the January issue.

Brands Registered.

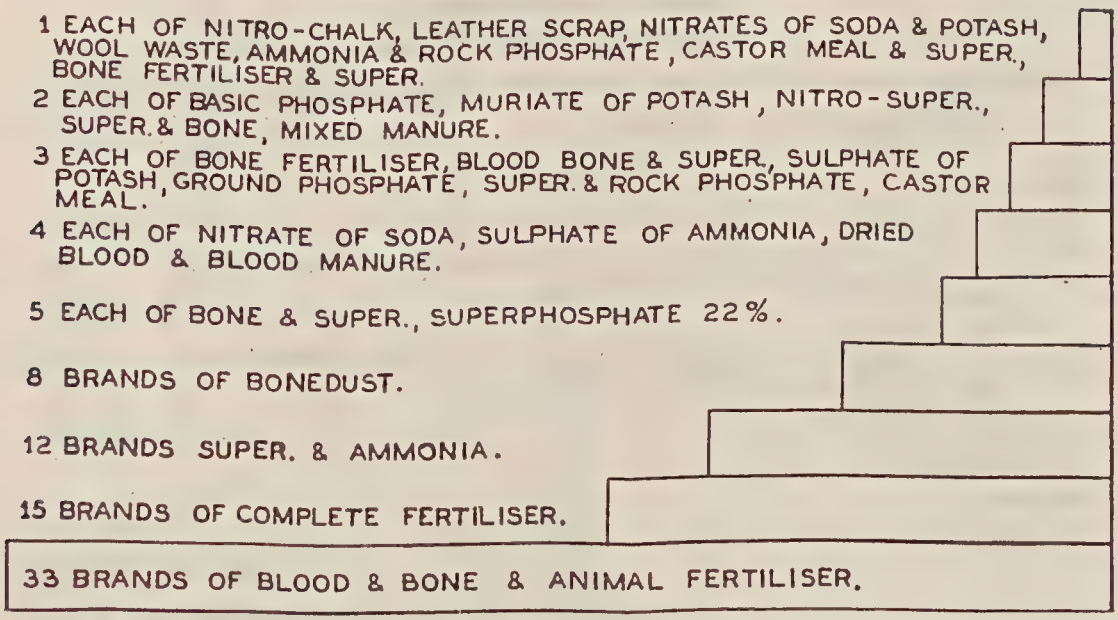
The number of brands registered in the main list for 1937 total 131, of which 49 (37.4 per cent.) represent fertilizers of purely animal origin, i.e., blood manures, bonedust, and blood and bone. It must not be assumed from these figures that fertilizers of this description are the most popular and have an output exceeding that of any brand of fertilizer.

During the past year when there was a decided shortage of fertilizers of animal origin approximately 12,000 tons were produced within the State, with a market value of over £90,000, whereas the manufacturers or vendors of the five brands of superphosphate which are registered, retailed more than a quarter of a million tons of this essential fertilizer for which the farmer paid approximately £800,000. For every ton of fertilizer of animal origin sold in the State during the year upwards of 20 tons of superphosphate were distributed.

In the accompanying diagrammatic sketch are depicted the numerous fertilizers registered for the coming season and the number of brands in the various sections. Altogether there are 28 different fertilizers or fertilizer mixtures registered and of these only eleven are sold as manufactured or imported, the remaining seventeen are blends or mixtures. The large number of registered brands for blood and bone (33) is due to the spread of the bone mills and freezing works throughout the State. This in turn may be explained by the necessity for treating immediately the offal from slaughter houses and, in addition, the compulsory removal of the bodies of dead animals as required by the health authorities. The manufacture of this class of fertilizer thus has a ready made foundation in a cheap supply of raw material.

Referring again to the diagrammatic sketch, the second step is represented by fifteen different brands of complete manures, while the mixed manure, super. and ammonia, comes next with twelve brands. The prevalence of brands of this description is due to the demand for mixed and complete fertilizers of varying composition, and as this demand is growing it may be assumed they are fulfilling requirements in actual practice.

Complete fertilizers are commonly used in the vineyards and citrus groves along the Murray and among the orchards and market gardens in the


1 EACH OF NITRO-CHALK, LEATHER SCRAP, NITRATES OF SODA & POTASH, WOOL WASTE, AMMONIA & ROCK PHOSPHATE, CASTOR MEAL & SUPER., BONE FERTILISER & SUPER.
2 EACH OF BASIC PHOSPHATE, MURIATE OF POTASH, NITRO-SUPER., SUPER. & BONE, MIXED MANURE.
3 EACH OF BONE FERTILISER, BLOOD BONE & SUPER., SULPHATE OF POTASH, GROUND PHOSPHATE, SUPER. & ROCK PHOSPHATE, CASTOR MEAL.
4 EACH OF NITRATE OF SODA, SULPHATE OF AMMONIA, DRIED BLOOD & BLOOD MANURE.
5 EACH OF BONE & SUPER., SUPERPHOSPHATE 22%.
8 BRANDS OF BONEDUST.
12 BRANDS SUPER. & AMMONIA.
15 BRANDS OF COMPLETE FERTILISER.
33 BRANDS OF BLOOD & BONE & ANIMAL FERTILISER.

Showing the number of fertilizers registered for the coming season and the number of brands in the various sections.

southern areas of the State. The complete fertilizer is a blend of the three main suppliers of the essential plant foods, i.e., sulphate of ammonia (nitrogen), superphosphate (phosphoric acid) and sulphate of potash (potash). Sometimes blood and bone is added, probably with the object of prolonging the nutritive or feeding period per medium of the organic nitrogen and bone phosphate. The mixed manure, super. and ammonia in various strengths, is used extensively by potato growers throughout Victoria. This type of fertilizer supplies phosphoric acid and nitrogen in readily available form.

The blend of blood, bonedust and superphosphate, as represented by the brands of bone and super.; blood, bone and super.; and super. and bone, is in constant demand for use as a fertilizer in most hay-growing areas. It should be noted that bone and super. consists of half bonedust and half superphosphate, whereas in super. and bone the proportion is three parts superphosphate to one part of bonedust. Blood, bone and superphosphate is a similar fertilizer to bone and super. except that the nitrogen content is increased by the addition of blood manure.

Basic phosphate, which is a mixture of superphosphate and slaked lime, made its appearance during the war as a substitute for basic slag or Thomas' phosphate for use on certain refractory soils. The latter fertilizer, which is a by-product from the manufacture of steel, is in appearance a totally different substance from the local basic phosphate. Fertilizers, such as nitro-chalk which supplies nitrogen in the form of both nitrate and ammonia associated with lime, are of immense value in floriculture, and with castor meal, wool waste, &c., are well deserving of a trial on large areas. Comparative prices in England and Victoria are shown in the accompanying table :—

PRICES OF FERTILIZERS IN ENGLAND AND VICTORIA.

Fertilizer.	London.	Victoria.
	per ton.	per ton.
	£ s. d.	£ s. d.
Nitrate of soda	7 12 6	13 7 6
Sulphate of ammonia	6 16 0	11 13 6
Nitro-chalk	7 5 0	11 15 0
Potassium chloride (Muriate) ..	8 1 0	13 0 0
Potassium sulphate	9 15 0	15 0 0
Superphosphate	3 15 0*	3 13 6
Bonedust	6 5 0	7 15 0
Nitrates of soda and potash ..	8 15 0	17 10 0

* Re-calculated from 14 per cent. to 20·5 per cent. water soluble phosphoric acid.

When making any comparisons between prices at home and abroad due allowance should be made for wharfage, insurance, freight, exchange and any other incidental, charges.

Fertilizers Act 1928 (No. 3680).

UNIT VALUES FOR THE YEAR 1937.

	£ s. d.
Nitrogen, organic, as Blood; Blood and Bone; Blood, Bone, and Flesh; and Fine Bone ..	0 18 8
„ as Nitrate	0 17 4
„ as Coarse Bone and in Bone Fertilizers	0 16 6
„ as Ammonia	0 11 4
Phosphoric Acid—	
as Water Soluble	0 3 7
as Citrate Soluble—	
in Blood and Bone and Animal Fertilizers and in Mixed and Complete Fertilizers containing either or both of the foregoing	0 4 0
in all other Fertilizers	0 3 0
as Citrate Insoluble—	
in Blood and Bone and Animal Fertilizers, and in Mixed and Complete Fertilizers containing either or both of the foregoing	0 3 6
in other Mixed Fertilizers and in Ground Phosphate	0 2 2
in other Fertilizers	0 1 0
as Fine Bone	0 4 9
as Coarse Bone	0 4 0
Potash—	
as Sulphate	0 6 2
as Chloride	0 5 2

Melbourne, 5th December, 1936.

W. R. JEWELL, M.Sc., F.I.C.,
Chemist for Agriculture.

LIST OF FERTILIZERS REGISTERED AT THE OFFICE OF THE DIRECTOR OF AGRICULTURE UNDER THE FERTILIZERS ACT 1928 (No. 3680) FOR THE YEAR 1937.

Description of Fertilizer.	Brand.	Nitrogen.						Phosphoric Acid.				Potash as Sulphate.	Price asked per ton.*	Where Obtainable.
		As Nitrate.	As Ammonia.	As Blood.	As Blood and Bone.	As Blood, Bone, and Flesh.	Total.	As Water Soluble.	As Citrate Soluble.	As Citrate Insoluble.	Total.			
Nitrogenous—Readily Available.		%	%	%	%	%	%	%	%	%	%	%	£ s. d.	
Nitrate of Soda	Sickle in diamond	15·50	..	..	..	..	15·50	..	..	..	..	..	13 10 0	Commonwealth Fertilisers and Chemicals Ltd., 65 William-st., Melbourne
„ „	Cresco ..	16·00	..	..	..	..	16·00	..	..	..	..	..	13 10 0	Cresco Fertilisers Ltd., Geelong
„ „	Pivot ..	15·50	..	..	..	..	15·50	..	..	..	..	..	13 10 0	The Phosphate Co-operative Co. of Aust. Ltd., 447 Little Collins-st., Melbourne
„ „	Sweetsoil (granulated)	16·00	..	..	..	..	16·00	..	..	..	..	..	13 0 0	Sweetsoil Lime and Fertilisers Pty. Ltd., 17 Queen-st., Melbourne
Sulphate of Ammonia	M.G. Co. in diamond	..	20·59	..	..	..	20·59	..	..	..	..	..	11 9 0	The Metropolitan Gas Co., 196 Flinders-st., Melbourne
„ „	Pivot ..	..	20·60	..	..	..	20·60	..	..	..	..	..	11 15 0	The Phosphate Co-operative Co. of Aust. Ltd., 447 Little Collins-st., Melbourne
„ „	Sickle in diamond	..	20·60	..	..	..	20·60	..	..	..	..	..	11 15 0	Commonwealth Fertilisers and Chemicals Ltd., 65 William-st., Melb.
„ „	Cresco ..	..	20·60	..	..	..	20·60	..	..	..	..	..	11 15 0	Cresco Fertilisers Ltd. Geelong
Nitro Chalk† ..	Sickle in diamond	7·75	7·75	..	..	..	15·50	..	..	..	..	..	11 15 0	Commonwealth Fertilisers and Chemicals Ltd., 65 William-st., Melbourne
Nitrates of Soda and Potash	Sweetsoil ..	15·00	..	..	..	..	15·00	..	..	..	..	15·00 (as nitrate)	17 10 0	Sweetsoil Lime and Fertilisers Pty. Ltd., 17 Queen-st., Melbourne
Moderately Available.														
Dried Blood ..	Imperial in diamond	..	..	12·00	..	..	12·00	..	..	..	..	..	11 0 0	W. Angliss and Co. (Aust.) Pty. Ltd., 42 Bourke-st., Melbourne
„ „ ..	T.B. & S. in diamond—Brooklyn	..	..	11·60	..	..	11·60	..	..	..	..	..	10 0 0	Thos. Borthwick and Sons (A/asia) Ltd., 84 William-st., Melbourne
„ „ ..	M.C.C. in diamond	..	..	11·50	..	..	11·50	..	..	..	..	..	9 10 0	Melbourne City Council, Town Hall, Melbourne
„ „ ..	Pannifex's ..	..	..	12·00	..	..	12·00	..	..	·50	·50	1·10	11 0 0	H. C. Pannifex and Co. Pty. Ltd., 4 Dudley-st., Melbourne
Blood Manure ..	M.C.C. in diamond	..	..	8·00	..	..	8·00	..	..	..	..	..	6 15 0	Melbourne City Council Town Hall, Melbourne
„ „ ..	Sickle in diamond	..	..	7·50	..	..	7·50	..	..	..	..	..	8 10 0	Commonwealth Fertilisers and Chemicals Ltd., 65 William-st., Melbourne
„ „ ..	Cockbills ..	..	..	8·50	..	..	8·50	..	..	1·00	1·00	..	9 10 0	W. and J. Cockbill (trading as J. Cockbill), 407 Post Office-place, Melbourne
„ „ ..	Nifex ..	..	..	7·50	..	..	7·50	..	..	1·00	1·00	·25	7 15 0	H. C. Pannifex and Co. Pty. Ltd., 4 Dudley-st., Melbourne
Slowly Available.														
Castor Meal ..	Alba ..	..	..	..	..	..	4·50 (as castor meal)	..	..	2·25	2·25	·75	4 0 0	Lycett Proprietary Ltd., Normanby-rd., Montague
„ „ ..	L.F.X. ..	..	..	..	..	..	4·50 (as castor meal)	..	..	2·25	2·25	·75	4 0 0	Lawford's Fruit Exchange Pty. Ltd., Williamsons-road, Doncaster
„ „ ..	Sweetsoil ..	..	..	..	..	..	4·50 (as castor meal)	..	..	2·25	2·25	·75	4 0 0	Sweetsoil Lime and Fertilisers Pty. Ltd., 17 Queen-st., Melbourne
Treated Leather Scrap	Fertilite ..	..	..	..	..	..	5·50 (as leather)	..	..	..	..	..	6 5 0	Cromwell Manufacturing Co. Pty. Ltd., 107-111 Cromwell-st., Collingwood
Wool Waste ..	A.L.T. ..	..	..	..	..	..	3·85 (unspecified)	..	..	·70	·70	·31	2 15 0	A. L. Thompson Pty. Ltd., 49 Grant-street, Port Melbourne

LIST OF FERTILIZERS REGISTERED AT THE OFFICE OF THE DIRECTOR OF AGRICULTURE UNDER THE FERTILIZERS ACT 1928 (No. 3680) FOR THE YEAR 1937—*continued.*

Description of Fertilizer.	Brand.	Nitrogen.						Phosphoric Acid.				Potash as Sulphate.	Price asked per ton.*			Where Obtainable.
		As Nitrate.	As Ammonia.	As Blood.	As Blood and Bone.	As Blood, Bone, and Flesh.	Total.	As Water Soluble.	As Citrate Soluble.	As Citrate Insoluble.	Total.		£	s.	d.	
		%	%	%	%	%	%	%	%	%	%	%				
Phosphatic—Readily Available.																
Superphosphate 22 per cent.	Cresco ..	..	..	..	..	..	..	20·50	·50	1·00	22·00	..	3	15	0	Cresco Fertilisers Ltd., Geelong
„ „	Sickle in diamond	..	..	..	..	..	..	20·50	·50	1·00	22·00	..	3	15	0	Commonwealth Fertilisers and Chemicals Ltd., 65 William-st., Melbourne
„ „	Pivot ..	..	..	..	..	..	..	20·50	·50	1·00	22·00	..	3	15	0	The Phosphate Co-operative Co. of Aust. Ltd., 447 Little Collins-st., Melbourne
„ „	Lamaco ..	..	..	..	..	..	..	20·50	·50	1·00	22·00	..	3	15	0	New Zealand Loan and Mercantile Agency Co. Ltd., 538 Collins-st., Melbourne
„ „	Cockbills ..	..	..	..	..	..	..	20·50	·50	1·00	22·00	..	3	10	0	W. and J. Cockbill (trading as J. Cockbill), 407 Post Office-place, Melbourne
Phosphate—Moderately Available.										..						
Basic Phosphate	Sickle in diamond	..	..	..	..	..	..	..	15·50	3·20	18·70	..	4	15	0	Commonwealth Fertilisers and Chemicals Ltd., 65 William-st., Melbourne
„ „	Pivot ..	..	..	..	..	..	..	..	15·50	3·00	18·50	..	4	15	0	The Phosphate Co-operative Co. of Aust. Ltd., 447 Little Collins-st., Melbourne
Super. and Rock Phosphate	„ ..	..	..	..	..	..	..	10·00	·50	18·50	29·00	..	4	5	0	„ „ „
„ „	Cresco 50/50 Phosphate	..	..	..	..	..	..	9·16	1·84	17·40	28·40	..	4	5	0	Cresco Fertilisers Ltd., Geelong
„ „	Sickle in diamond	..	..	..	..	..	..	10·00	·50	18·50	29·00	..	4	5	0	Commonwealth Fertilisers and Chemicals Ltd., 65 William-st., Melbourne
Slowly Available.																
Ground Phosphate	Sickle in diamond (80%)	..	..	..	..	..	..	..	..	36·65	36·65	..	4	0	0	„ „ „
„ „	Pivot ..	..	..	..	..	..	..	..	..	36·50	36·50	..	3	15	0	The Phosphate Co-operative Co. of Aust. Ltd., 447 Little Collins-st., Melbourne
„ „	Pivot (very fine)	..	..	..	..	..	..	..	..	36·50	36·50	..	4	0	0	„ „ „
Potassic—Readily Available.																
Sulphate of Potash	Cresco ..	..	..	..	..	..	..	..	..	..	..	48·50	15	0	0	Cresco Fertilisers Ltd., Geelong
„ „	Pivot ..	..	..	..	..	..	..	..	..	..	..	48·50	15	0	0	The Phosphate Co-operative Co. of Aust. Ltd., 447 Little Collins-st., Melbourne
„ „	Sickle in diamond (90%)	..	..	..	..	..	..	..	..	..	..	48·50	15	0	0	Commonwealth Fertilisers and Chemicals Ltd., 65 William-st., Melbourne
Muriate of Potash	Sickle in diamond (80%)	..	..	..	..	..	..	..	..	..	..	50·00	13	0	0	„ „ „
„ „	Cresco ..	..	..	..	..	..	..	..	..	..	..	50·00	13	0	0	Cresco Fertilisers Ltd., Geelong
Containing Nitrogen and Phosphoric Acid—Readily Available.																
Super. and Ammonia	Cresco (1 and 1)	..	10·30	..	..	..	10·30	10·25	·25	·50	11·00	..	8	5	6	„ „ „
„ „	Cresco (2 and 1)	..	6·87	..	..	..	6·87	13·66	·34	·66	14·66	..	7	0	0	„ „ „
„ „	Cresco (3 and 1)	..	5·00	..	..	..	5·00	15·37	..	1·13	16·50	..	6	6	6	„ „ „
„ „	Cresco (6 and 1)	..	2·85	..	..	..	2·85	17·48	·42	·85	18·75	..	5	10	6	„ „ „
„ „	Pivot III. ..	..	10·00	..	..	..	10·00	10·20	·20	·50	10·90	..	8	5	6	The Phosphate Co-operative Co. of Aust. Ltd., 447 Little Collins-st., Melbourne
„ „	Pivor II. (A) ..	..	6·80	..	..	..	6·80	13·60	·30	·60	14·60	..	7	0	0	„ „ „
„ „	Pivot II. ..	..	5·00	..	..	..	5·00	15·30	·30	·80	16·40	..	6	6	6	„ „ „
„ „	Pivot I. ..	..	2·90	..	..	..	2·90	17·40	·40	·80	18·60	..	5	10	6	„ „ „

LIST OF FERTILIZERS REGISTERED AT THE OFFICE OF THE DIRECTOR OF AGRICULTURE UNDER THE FERTILIZERS ACT 1928 (No. 3680) FOR THE YEAR 1937—*continued.*

Description of Fertilizer.	Brand.	Nitrogen.						Phosphoric Acid.				Potash as Sulphate.	Price asked per ton.*	Where Obtainable.
		As Nitrate.	As Ammonia.	As Blood.	As Blood and Bone.	As Blood, Bone, and Flesh.	Total.	As Water Soluble.	As Citrate Soluble.	As Citrate Insoluble.	Total.			
		%	%	%	%	%	%	%	%	%	%	%	£ s. d.	
Readily Available.—continued.														
Super. and Ammonia	Sickle in diamond (1 and 1)	..	10·30	..	..	..	10·30	10·25	·25	·50	11·00	..	8 5 6	Commonwealth Fertilisers and Chemicals Ltd., 65 William-st., Melbourne
,, ,,	Sickle in diamond (2 and1)	..	6·87	..	..	..	6·87	13·66	·34	·66	14·66	..	7 0 0	,, ,, ,,
,, ,,	Sickle in diamond (3 and 1)	..	5·00	..	..	..	5·00	15·40	·30	·80	16·50	..	6 6 6	,, ,, ,,
,, ,,	Sickle in diamond (6 and 1)	..	2·90	..	..	..	2·90	17·50	·40	·90	18·80	..	5 10 6	,, ,, ,,
Nitro Superphosphate	Sickle in diamond	..	1·50	..	..	·50	2·00	16·70	1·10	2·00	19·80	..	5 17 6	,, ,, ,,
,, ,,	Cresco ..	..	1·50	..	·50	..	2·00	16·39	1·10	1·70	19·19	..	5 17 6	Cresco Fertilisers Ltd., Geelong
Moderately Available.														
Ammonia and Rock Phosphate	,, ..	..	2·00	..	..	..	2·00	8·30	1·60	15·70	25·60	..	5 5 6	,, ,, ,,
Blood, Bone, and Super.	Sickle in diamond	..	..	..	..	2·50	2·50	12·51	1·43	2·96	16·90	..	6 2 6	Commonwealth Fertilisers and Chemicals Ltd., 65 William-st., Melbourne
,, ,,	Clover ..	..	..	..	2·90	..	2·90	7·68	3·28	9·38	20·34	..	5 15 0	A. S. Miller, Queen-st., Ararat
Blood, Bone, and Super.	Cockbill's ..	..	..	..	2·50	..	2·50	12·51	1·43	2·96	16·90	..	7 10 0	W. and J. Cockbill (trading as J. Cockbill), 47 Post Office-place, Melbourne
Bone and Super.	Dundas' ..	..	..	..	..	2·25	2·25	9·99	5·16	5·58	20·73	..	7 10 0	J. A. Dundas, Dynon-rd., Footscray
,, ,,	Sickle in diamond, No. 1	..	..	..	..	2·00	2·00	11·40	3·00	5·30	19·70	..	6 5 0	Commonwealth Fertilisers and Chemicals Ltd., 65 William-st., Melbourne
,, ,,	G.B.P. ..	..	..	..	1·72	..	1·72	10·00	6·00	6·00	22·00	..	6 17 6	Gippsland Bone Products, Ronchi Bros., Raymond-st., Sale
,, ,,	Cresco No. 1 ..	..	..	..	2·00	..	2·00	9·50	3·90	3·00	16·40	..	6 5 0	Cresco Fertilisers Ltd., Geelong
,, ,,	Apex ..	..	..	..	1·62	..	1·62	10·25	3·25	8·50	22·00	..	6 10 0	North-eastern Bone Products, Wangaratta
Super. and Bone	Cresco No. 2 ..	..	..	..	..	1·00	1·00	16·10	1·10	3·60	20·80	..	5 12 6	Cresco Fertilisers Ltd., Geelong
,, ,,	Sickle in diamond No. 2	..	..	..	..	1·00	1·00	16·00	1·80	3·10	20·90	..	5 12 6	Commonwealth Fertilisers and Chemicals Ltd., 65 William-st., Melbourne
Bone Fertilizer and Super.	Elsworth's ..	..	..	..	..	1·50	1·50	11·00	2·50	5·00	18·50	..	5 12 6	W. R. Elsworth, cr. York and Joseph sts., Ballarat
Castor Meal and Super.	Sweetsoil ..	..	..	..	..	..	3·00 (as castor meal)	6·85	·16	1·83	8·82	·50	4 6 0	Sweetsoil Lime and Fertilisers Pty. Ltd., 17 Queen-st., Melbourne
Blood and Bone	Sickle in diamond	..	..	..	..	5·00	5·00	..	6·00	10·00	16·00	..	7 10 0	Commonwealth Fertilisers and Chemicals Ltd., 65 William-st., Melbourne
,, ,,	J. A. Dundas' ..	..	..	..	..	4·50	4·50	..	7·14	13·61	20·75	..	8 0 0	J. A Dundas, Dynon-rd., Foorscray
,, ,,	Corio ..	..	..	..	4·00	..	4·00	..	6·00	8·00	14·00	..	6 10 0	The Corio Trading Co. Pty. Ltd., Bacchus Marsh-rd., Corio
,, ,,	Cockbill's ..	..	..	..	..	5·25	5·25	..	3·00	9·00	12·00	..	8 10 0	W. and J. Cockbill (trading as J. Cockbill), 407 Post Office-place, Melbourne
,, ,,	Imperial in diamond	..	..	..	5·00	..	5·00	..	5·00	11·00	16·00	..	7 0 0	W. Angliss and Co. (Aust.) Pty. Ltd., 42 Bourke-st. Melbourne
,, ,,	W. & M. in circle	..	..	..	5·00	..	5·00	..	4·50	7·50	12·00	..	7 0 0	Western and Murray Co-operative Bacon and Meat Packing Co. Ltd., 522 Flinders-lane, Melbourne

LIST OF FERTILIZERS REGISTERED AT THE OFFICE OF THE DIRECTOR OF AGRICULTURE UNDER THE FERTILIZERS ACT 1928 (No. 3680) FOR THE YEAR 1937—*continued.*

Description of Fertilizer.	Brand.	Nitrogen.						Phosphoric Acid.				Potash as Sulphate.	Price asked per ton.*	Where Obtainable.
		As Nitrate.	As Ammonia.	As Blood.	As Blood and Bone.	As Blood, Bone, and Flesh.	Total.	As Water Soluble.	As Citrate Soluble.	As Citrate Insoluble.	Total.			
Moderately Available.—continued.		%	%	%	%	%	%	%	%	%	%	%	£ s. d.	
Blood and Bone	Pridham's	..	..	..	5·40	..	5·40	..	8.50	5·50	14·00	..	6 10 0	W. Pridham Pty. Ltd. Evans-st., Braybrook
,, ,,	Echuca ..	..	..	..	3·66	..	3·66		4·72	11.31	16·03	..	6 15 0	Thomas and Sulman, Goulburn-rd., Echuca East
,, ,,	Ibis	..	..	..	..	4·00	4·00	..	7·90	8·10	16·00	..	6 12 6	Ficken, Halliday and McClelland Pty. Ltd., 91 Swan-st., Richmond
,, ,,	Apollo ..	..	..	..	5·00	..	5·00	..	4·00	12·00	16·00	..	8 0 0	J. Kitchen and Sons Pty. Ltd., Ingles-st., Port Melbourne
,, ,,	Fertillo ..	..	..	..	..	6·00	6·00	..	6·00	9·00	15·00	..	8 15 0	Glues and By-products Pty. Ltd., 86 King-st., Melbourne
,, ,,	Cockatoo ..	..	..	..	4·50	..	4·50	..	5·90	5·88	11·78	..	6 0 0	R. Fordham, Cressy-rd., Camperdown
,, ,,	Champion No. 2	..	..	..	7·00	..	7·00	..	3·20	10·20	13·40	..	8 10 0	Sims Cooper (Freezing Works) Pty. Ltd., Henty House, 499 Lit. Collins-st., Melbourne
,, ,,	Champion No. 4	..	..	..	6·50	..	6·50	..	6·50	7·50	14·00	..	8 0 0	,, ,, ,,
,, ,,	Fitzgerald's ..	..	..	..	5·25	..	5·25	..	5·50	9·00	14·50	..	7 10 0	P. Fitzgerald and Sons, Oakleigh
,, ,,	Clover ..	..	..	..	4·76	..	4·76	..	9·81	6·17	15·98	..	7 0 0	A. S. Miller, Queen-st., Ararat
,, ,,	T.B. and S. in diamond (Lighthouse)	..	..	..	6·00	..	6·00	..	5·00	2·00	7·00	..	7 10 0	Thos. Borthwick and Sons (A'asia) Ltd., 84 William-st., Melbourne
,, ,,	T.B. and S. in diamond (Brooklyn)	..	..	..	6·00	..	6·00	..	6·00	6·00	12·00	..	7 10 0	,, ,, ,,
,, ,,	Eclipse ..	..	..	..	..	2·98	2·98	..	9·96	6·86	16·82	..	7 0 0	T. A. Mills, Spec Gully, Golden Square
,, ,,	Apex ..	..	..	..	..	5·00	5·00	..	5·00	10·00	15·00	..	7 10 0	North-eastern Bone Products, Wangaratta
,, ,,	Nutro ..	..	..	..	6·00	..	6·00	..	3·50	3·00	6·50	..	7 5 0	Dandy Tallow Pty. Ltd., Dandy Park, Dandenong
,, ,,	Nutro (animal fertilizer)	..	..	..	5·00	..	5·00	..	4·50	2·50	7·00	..	7 5 0	,, ,, ,,
,, ,,	Fitzgerald's (animal fertilizer)	..	..	..	3·75	..	3·75	..	6·00	13·00	19·00	..	7 10 0	P. Fitzgerald and Sons, Oakleigh
,, ,,	Pannifex's No. 1	..	..	..	..	5·50	5·50	..	8·00	6·00	14·00	..	7 15 0	H. C. Pannifex and Co. Pty. Ltd., 4 Dudley-st., Melbourne
,, ,,	Pannifex's No. 2	..	..	..	..	7·00	7·00	..	5·00	6·00	11·00	..	9 0 0	,, ,, ,,
,, ,,	Pannifex's No. 3	..	..	..	..	5·50	5·50	..	5·00	10·00	15·00	..	8 0 0	,, ,, ,,
,, ,,	Pannifex's No. 4	..	..	..	..	6·00	6·00	..	5·00	7·00	12·00	..	8 0 0	,, ,, ,,
,, ,,	Pannifex's No. 5	..	..	..	..	8·00	8·00	..	3·00	5·00	8·00	..	9 0 0	,, ,, ,,
,, ,,	Pannifex's No. 6	..	..	..	..	6·00	6·00	..	6·00	10·00	16·00	..	8 10 0	,, ,, ,,
,, ,,	Pannifex's No. 7	..	..	..	..	4·00	4·00	..	7·00	9·00	16·00	..	6 15 0	,, ,, ,,
,, ,,	Pannifex's No. 8	..	..	..	..	4·50	4·50	..	6·00	12·00	18·00	..	7 15 0	,, ,, ,,
,, ,,	Pannifex's No. 9	..	..	..	..	7·00	7·00	..	4·00	5·00	9·00	..	8 10 0	,, ,, ,,
,, ,,	Tongala ..	..	..	..	..	4·30	4·30	..	6·25	6·84	13·09	..	6 10 0	L. L. Russell, Tongala
,, ,,	A.N.A. Surprise	..	..	..	..	5·00	5·00	..	4·00	10·00	14·00	..	7 10 0	G. W. Pennell, Burke-st., Braybrook
Bone Fertilizer	Elsworth's ..	..	..	..	..	4·00	4·00	·50	5·80	11·70	18·00	..	6 10 0	W. R. Elsworth, cr. York and Joseph sts., Ballarat
,, ,,	Newnham's ..	..	..	..	..	..	2·28 (as bone	..	6·86	16·72	23·58	..	5 0 0	Newnham Pty. Ltd., Box 8, P.O., Sale
,, ,,	Valley ..	..	..	..	..	5·86	5·86	..	3·21	1·87	5·08	..	5 10 0	Goulburn Valley Freezing Works, Shepparton
Mixed Manure	Humo-Phos. ..	..	1·28	..	..	1·03 (organic)-	2·31	..	..	5·46	5·46	..	4 0 0	Peninsula Lime and Fertiliser Co., 70 Elizabeth-st., Melbourne
,, ,,	Organite in shield	..	1·00	..	..	4·50 (as trtd. leather)	5·50	3·00	..	..	3·00	..	7 3 0	Organite Pty. Ltd., 450 Smith-st., Collingwood

LIST OF FERTILIZERS REGISTERED AT THE OFFICE OF THE DIRECTOR OF AGRICULTURE UNDER THE FERTILIZERS ACT 1928 (No. 3680) FOR THE YEAR 1937—*continued.*

Description of Fertilizer.	Brand.	Nitrogen.						Phosphoric Acid.				Potash as Sulphate.	Price asked per ton.*			Where Obtainable.
		As Nitrate.	As Ammonia.	As Blood.	As Blood and Bone.	As Blood, Bone, and Flesh.	Total.	As Water Soluble.	As Citrate Soluble	As Citrate Insoluble.	Total.		£	s.	d.	
		%	%	%	%	%	%	%	%	%	%	%				
Containing Nitrogen, Phosphoric Acid and Potash																
Complete Manure	Sickle, No. 1 ..	..	1·00	..	..	1·40	2·40	10·90	2·20	3·90	17·00	5·00 (as muriate)	7	2	6	Commonwealth Fertilisers and Chemicals Ltd., 65 William-st., Melbourne
,, ,,	Sickle in diamond, No. 2	..	1·00	..	..	1·00	2·00	14·80	·40	·70	15·90	4·80	7	0	0	,, ,, ,,
,, ,,	Sickle in diamond (Market Garden)	..	1·70	..	..	1·50	3·20	10·30	2·40	4·20	16·90	2·42	7	7	6	,, ,, ,,
,, ,,	Sickle in diamond (A) (5.1.1)	..	2·90	..	..	..	2·90	14·60	·40	·70	15·70	6·90	7	1	6	,, ,, ,,
,, ,,	Sickle in diamond (B) (5.2.1)	..	5·00	..	..	..	5·00	12·80	·30	·60	13·70	6·00	7	19	0	,, ,, ,,
,, ,,	Sickle in diamond (C) (4.4.1)	..	9·15	..	..	..	9·15	9·11	·22	·44	9·77	5·39	9	5	0	,, ,, ,,
,, ,,	Sickle in diamond (D) (2.2.1)	..	8·24	..	..	..	8·24	8·20	·20	·40	8·80	10·00 (Unspecified)	9	14	0	,, ,, ,,
,, ,,	Pivot IV. ..	..	2·90	..	..	..	2·90	14·30	·30	·70	15·30	6·90	7	1	6	The Phosphate Co-operative Co. of Aust. Ltd., 447 Little Collins-st., Melbourne
,, ,,	Pivot V. ..	..	8·20	..	..	..	8 20	8·20	·20	·40	8·80	9·60	9	14	0	,, ,, ,,
,, ,,	Pivot VI. ..	..	9·10	..	..	..	9·10	9·10	·20	·40	9·70	5·30	9	5	0	,, ,, ,,
,, ,,	Cresco No. 1 ..	..	1·00	..	1·40	..	2·40	11·25	2·00	4·50	17·75	5·00	7	2	6	Cresco Fertilisers Ltd., Geelong
,, ,,	Cresco (Market Garden)	..	1·50	..	1·56	..	3·06	11·65	1·49	3·26	16·40	2·42	7	7	6	Cresco Fertilisers Ltd., Geelong
,, ,,	Cresco, No. 2 ..	..	9·15	..	..	..	9·15	9·11	·22	·44	9·77	5·39	9	5	0	,, ,, ,,
,, ,,	Cresco, No. 3 ..	..	5·15	..	..	..	5·15	12·81	·31	·63	13·75	6·06	7	19	0	,, ,, ,,
,, ,,	Cresco, No. 4 ..	..	8·24	..	..	..	8·24	8·20	·20	·40	8·80	10·00 (as muriate)	9	14	0	,, ,, ,,

Description of Fertilizer.	Brand.	Nitrogen.	Phosphoric Acid.	Mechanical Condition.		Price asked per ton.*			Where Obtainable.
				Fine Bone.	Coarse Bone.	£	s.	d.	
		%	%	%	%				
Bonedust ..	Pannifex's No. 1	1·00	30·00	100	..	8	10	0	H. C. Pannifex and Co. Pty. Ltd., 4 Dudley-st., Melbourne
,, ..	Pannifex's No. 2	3·50	19·00	50	50	8	5	0	,, ,, ,, ,, ,,
,, ..	G.B.P. ..	3·44	24·00	65	35	8	10	0	Gippsland Bone Products, Raymond-st., Sale
,, ..	Mount Clear ..	3·00	19·00	50	50	6	10	0	Bailey Bros., 6 Sturt-st., Ballarat
,, ..	Nuelife ..	3·50	22·00	50	50	7	15	0	E. F. Peters and Sons Pty. Ltd., Dunolly
,, ..	Pioneer ..	3·82	21·96	50	50	8	0	0	W. A. Rainey, Mepunga East
,, ..	Apex ..	3·25	20·00	50	50	7	10	0	North-Eastern Bone Products, Wangaratta
,, ..	Eclipse ..	3·04	25·52	67	33	7	0	0	T. A. Mills, Spec Gully, Golden Square

* F.O.R. at Melbourne or Railway Station nearest place of manufacture.——† This fertilizer contains approximately 50 per cent. of lime.

W. R. JEWELL, M.Sc., F.I.C.,
Chemist for Agriculture.

Orchard and Garden Notes

By Edward E. Pescott, F.L.S.

The Flower Garden.

As much of the flower garden as possible should be mulched in early summer. There should really be a double mulch. First the soil surface should be well hoed, either with the cutting or with the prong hoe, preferably the latter, so as to create a loose soil tilth.

Then it should be given a mulch a couple of inches deep consisting of any humic material, such as old stable manure, old chaff, grass, garden litter, or anything that will provide a protective covering to the beds, and so keep the soil moist and the roots cool.

Then comes the sowing of seeds. All autumn and early winter-flowering annuals should now be raised from seed. These include sweet pea, Iceland poppy, cineraria, stock, wallflower, nemesia, and primula.

Seeds sown in January in a nicely mulched bed will germinate quickly, and develop into strong plants that will flower when the cool weather sets in.

Mulching is very desirable for roses; it should be of manure, so as to induce a good growth for autumn. If the mulch has little food value, some blood manure should be added.

The Orchard.

Every effort must be made in the citrus areas to control and, if possible, eradicate the red scale. There are two methods of destruction. One is by fumigation with hydrocyanic-acid gas. In this case the affected tree is covered with a gas-proof tent, and the gas is generated therein. Under such treatment all insect life should be killed.

The fumigation must not be done when the light is very bright, or during hot weather. The best times are on dull days and in the evenings, and even at night.

Petunias.

The method of attack, when fumigation outfits are not available, is to spray the trees with white oil of an emulsion strength of 1 gallon of oil to 35 gallons of water. An early January spray is necessary; if it is not entirely effective, a later one may be given in March. Where the infestation has been at all serious, both sprays will be necessary, if clean fruit is to be harvested, and if the trees are to remain healthy.

The Kitchen Garden.

This is the period when both early and late tomatoes will be producing ripe fruit. The crops should be mulched and watered freely, and if it be desired to keep them in bearing, all laterals and new growing shoots must be pinched out as they develop.

Crops growing and not yet bearing should have regular supplies of plant food. This is best given in the form of blood manure and may be watered in. As the fruit commences to ripen, manuring should be very moderate, if any is given at all.

Similar attention may be given to crops of beans, and those of the pumpkin, melon, and marrow family. Not only should the plants be well manured; they must be very freely watered in summer, especially when the days are sunny, hot, or windy.

Clery plants should be set out in well-manured trenches, or else in deeply dug beds, if the surface-growing system is to be adopted.

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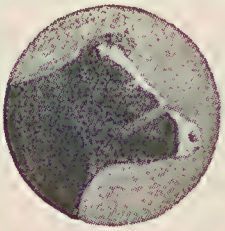

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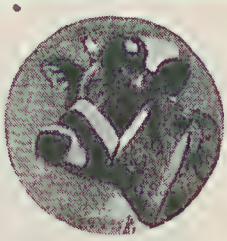

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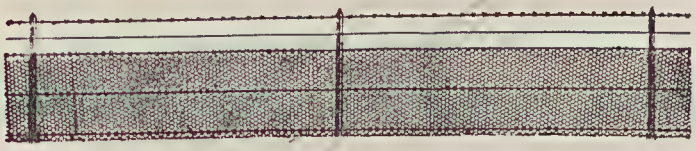

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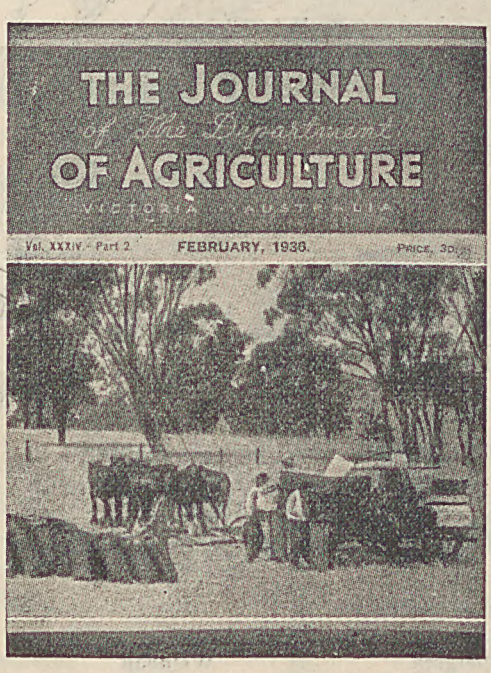

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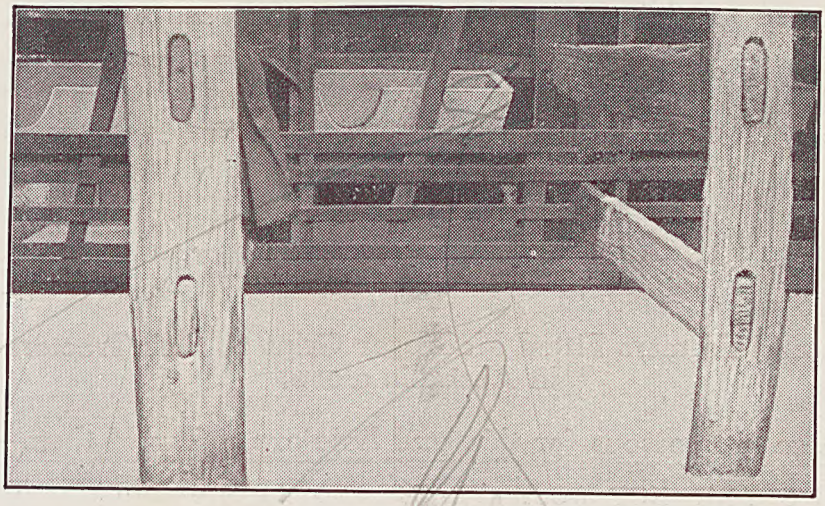

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